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TRANSCRIPT OF RECORD.

SUPREME COURT OF THE UNITED STATES.

No. ~~322~~ 63

THE GIANT-POWDER COMPANY, APPELLANT,

vs.

THE CALIFORNIA POWDER-WORKS, JOHN H. BAIRD, N. G. KITTLE, JOHN O. EARL, J. B. HAGGIN, G. P. LAWTON, THOMAS POWNING, WILLIAM WILSON, AND JOHN MEERLANDER.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE DISTRICT OF CALIFORNIA.

FILED DECEMBER 3, 1875.

SUPREME COURT OF THE UNITED STATES.

No. 322.

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vs.

THE CALIFORNIA POWDER-WORKS, JOHN H. BAIRD, N. G. KITTLE, JOHN O. EARL, J. B. HAGGIN, G. P. LAWTON, THOMAS POWNING, WILLIAM WILSON, AND JOHN MEERLANDER.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE DISTRICT OF CALIFORNIA.

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1 *Bill of complaint.*

In the circuit court of the United States, in and for the district of California, ninth circuit.

THE GIANT POWDER COMPANY
vs.
THE CALIFORNIA POWDER WORKS, JOHN H. Baird, N. G. Kittle, John O. Earl, J. B. Haggin, G. P. Lawton, Tho's Powning, William Wilson, and John Meerlander. } In equity.

To the honorable the justices of the circuit court of the United States for the ninth circuit, within and for the district of California, sitting in equity:

The Giant Powder Company, a corporation created and existing under the laws of the State of California, and having its principal place of business in the city and county of San Francisco, in said State, brings this its bill against the California Powder Works, also a corporation created and existing under the laws of said State, and having
2 its principal place of business in said city and county, and against John H. Baird, N. G. Kittle, John O. Earl, J. B. Haggin, G. P. Lawton, Tho's Powning, William Wilson, and John Meerlander.

And thereupon your orator complains and says: That heretofore, to wit, before the twenty-fourth day of October, in the year one thousand eight hundred and sixty-five, Alfred Nobel, of Hamburg, in Germany, was the original and first inventor of certain new and useful discoveries and inventions in the arts of manufacturing nitro-glycerine, and using it as a practical explosive agent. That the same were new and useful inventions, and consisted of an improved process for manufacturing nitro-glycerine; also forming a new explosive compound by mixing nitro-glycerine with gunpowder; also forming a new explosive compound by mixing nitro-glycerine with gun-cotton, and the mixture of rocket-powder with nitro-glycerine; also exploding nitro-glycerine by detonation; also the application and use of percussion caps and other explosives to produce the necessary detonation for exploding nitro-glycerine. That the same were not known or used before his said inventions, and had not, at the time of his application for a patent,
3 been in public use, or on sale with his consent or allowance, for two years.

That the said Alfred Nobel, being so as aforesaid the inventor thereof, on the 24th day of October, 1865, upon due application therefor, did obtain letters-patent for the said inventions, which said letters-patent were issued in due form of law under the seal of the Patent Office of the United States, and were signed by the Acting Secretary of the Interior, and countersigned by the Commissioner of Patents of the United States, and bore date the day and year last aforesaid, and were numbered 50617.

That afterwards, to wit, on or about the 27th day of July, 1866, by an instrument in writing of that date, the said Alfred Nobel assigned and transferred to the United States Blasting Oil Company, a corporation created and existing under the laws of the State of New York, and having its principal place of business in the city and county and State

of New York, the said letters-patent, and all his right, title, and interest in or under the same, as well as in and to the inventions aforesaid.

That afterwards, to wit, on the 13th day of April, 1869, upon due application therefor, and upon the surrender to the Commissioner of Patents of the letters-patent aforesaid, four new divisional letters-
4 patent were duly issued to the said United States Blasting Oil Company for the same inventions, for the residue of the period then unexpired, for which the said original patent was granted, and were numbered and designated as follows, to wit: Reissue No. 3377, division A, and was for the said method of exploding nitro-glycerine by detonation. Reissue No. 3378, division B, and was for the application and use of percussion caps and other exploders to create the detonation necessary to explode the nitro-glycerine. Reissue No. 3379, division C, and was for the improved mode of manufacturing nitro-glycerine. Reissue No. 3380, division D, and was for the new explosive compounds invented by said Nobel, viz, the mixture of gunpowder and nitro-glycerine, and the mixture of gun-cotton and nitro-glycerine, and the mixture of rocket-powder with nitro-glycerine.

That each of the four letters-patent last named was dated April 13th, 1869, and issued in due form of law under the seal of the Patent Office, signed by the Acting Secretary of the Interior, and countersigned by the Commissioner of Patents, and delivered to the said United States Blasting Oil Company.

5 That afterwards, to wit, on the 19th day of March, 1872, upon due application therefor, and upon the surrender to the Commissioner of Patents of one of the four divisional letters-patent last above described, to wit, the said reissue No. 3380, division D, two new divisional letters-patent for the same inventions for the residue of the period then unexpired, for which the said original patent was granted, were duly issued to the said United States Blasting Oil Company, and were numbered and designated as follows, to wit: Reissue No. 4818, division D, for the mixture of gunpowder with nitro-glycerine, and reissue No. 4819, division E, for the mixture of rocket-powder with nitro-glycerine.

That each of the two letters-patent last named was dated March 19, 1872, and was in due form of law issued under the seal of the Patent Office, signed by the Acting Secretary of the Interior, and countersigned by the Commissioner of Patents, and delivered to the said United States Blasting Oil Company. That in and by each of the last-named letters-patent there was secured to the said United States Blasting Oil Company, and to its successors and assigns, for the term aforesaid, the full and exclusive right of making, using, and vending to others
6 to be used, the invention, to wit, the explosive compound therein described respectively.

That afterwards, to wit, on or about the 12th day of April, 1873, by an instrument in writing of that date, the said United States Blasting Oil Company duly assigned and transferred to the Atlantic Giant Powder Company, a corporation created and existing under the laws of the State of California, and having its principal place of business in the city and county of San Francisco, and State aforesaid, the two reissued letters-patent last above described, and all the rights, liberties, and privileges by them granted and conferred, and the inventions therein mentioned.

And afterwards, to wit, on or about the 15th day of April, 1874, by an instrument in writing of that date, the said Atlantic Giant Powder Company duly assigned and transferred to your orator said last-named letters-patent, to wit: Reissue No. 4818, division D, and reissue No. 4819,

division E, within, for, and throughout all those States and Territories of the United States which lie west of the easterly boundary lines of the Territories of Montana, Wyoming, Colorado, and New Mexico, and all the rights, liberties, and privileges by them granted and con-
7 ferred, and the inventions therein mentioned.

And your orator further shows that before the 26th day of May, 1868, the said Alfred Nobel was the original and first inventor of a certain new and useful composition of matter, being a combination or mixture of nitro-glycerine with porous or absorbent substances, whereby a compound is formed now generally known as dynamite or giant powder, which is very effective as an explosive, and at the same time far more safe and convenient for handling, transportation, storage, and use than nitro glycerine in its ordinary condition as a liquid.

That the same was not known or used before the invention thereof by the said Nobel as aforesaid, and had not been, at the time of his application for letters patent therefor, in use or on sale for two years.

That said Nobel, being so as aforesaid the inventor of said composition of matter, made application in due form of law for letters patent therefor, and having complied in all respects with the conditions and requisitions of the laws then in force, on the 26th day of May, 1868, letters patent of the United States, the same being No. 78317, dated
8 the day and year aforesaid, sealed with the seal of the Patent-Office, signed by the Acting Secretary of the Interior, and countersigned by the Commissioner of Patents, and otherwise executed and attested in due form of law, were issued for the said invention.

That on or about the 4th day of April, 1868, and after the making of said invention, and before the application for letters patent therefor, as aforesaid, the said Nobel, by an instrument in writing, sold, assigned, and transferred to one Julius Bandmann, of the city and county of San Francisco aforesaid, the said invention, together with all his right, title, and interest in or to the same, as well as in or to the letters patent that might be issued therefor; and the said assignment having been duly recorded in the Patent-Office, the letters patent aforesaid were granted and issued to said Bandmann.

That afterwards, to wit, in the month of June, A. D. 1868, the said Julius Bandmann assigned and conveyed to your orator, The Giant Powder Company, the last-mentioned invention and letters patent, bearing date on the twenty-sixth day of May, A. D. 1868. Said as-
9 signment was in writing, and was duly recorded in the Patent-Office.

That afterwards, to wit, on the 21st day of October, A. D. 1873, upon due application therefor and upon the surrender to the Commissioner of Patents of the United States of the letters patent last aforesaid, new letters patent were duly issued to your orator for the same invention for the residue of the period then unexpired for which the said original patent was granted; that the letters patent so reissued were issued in due form of law, under the seal of said Patent-Office, and were signed by the Acting Secretary of the Interior and countersigned by the Commissioner of Patents, and were dated the day and year last aforesaid, and were delivered to your orator, the same being designated as reissue No. 5619.

That afterwards, to wit, on the 17th day of March, A. D. 1874, upon due application therefor and upon the surrender to the Commissioner of Patents of the United States of the letters patent last aforesaid, new letters patent were duly issued to your orator for the same invention for the residue of the period then unexpired for which the said original

patent was granted; that the letters patent so reissued were
10 issued in due form of law, under the seal of said Patent-Office, and were signed by the Acting Secretary of the Interior and countersigned by the Commissioner of Patents, and were dated the day and year last aforesaid, and were delivered to your orator, the same being designated as reissue No. 5799, whereby there was secured to your orator and its successors and assigns, for the term aforesaid, the full and exclusive right of making, using, and vending to others to be used, the invention therein described.

The subject-matters of all the foregoing allegations will appear more fully and at large from the several instruments mentioned, to wit, the said original letters patent, the several reissues aforesaid, and the several assignments aforesaid, each of which was duly recorded in the Patent-Office, immediately on the execution therefor, and prior to the commencement of this action, and all of which, or duly-authenticated copies of which, your orator will produce in court.

That prior to the issuing of said original letters patent, as well as prior to the issuing of each of the reissues aforesaid, all proceedings were had and taken which were required by law to be had and
11 taken previous to the issuance or reissuance, respectively, of letters patent granting special rights and liberties for new and useful inventions. And your orator says that within, for, and throughout all those States and Territories which lie west of the easterly boundary lines of the Territories of Montana, Wyoming, Colorado, and New Mexico, your orator is still the owner and holder of three of the reissued letters patent hereinbefore described, to wit, reissue No. 4818, division D, dated March 19, 1872; reissue No. 4819, division E, dated March 19, 1872; and reissue No. 5799, dated March 17, 1874, and of all the rights, privileges, and liberties by them granted.

And your orator further shows unto your honors that always since the said inventions were made and said letters patent issued, the said Alfred Nobel and his assignees, each, during the times respectively that each was the owner thereof, have been in the exercise of the full and exclusive rights and liberties so granted as aforesaid by said letters patent, and have made, constructed, used, and vended to others to be used, the said inventions and each of them so patented, and have had and maintained until the infringements hereinafter complained of, the
12 possession of the said inventions, under and by virtue of said letters patent, and have never acquiesced in any invasion or infringement of any of their said rights.

And your orator further shows unto your honors that the respondents herein, having full knowledge of the premises and in violation of your orator's exclusive rights, liberties, and privileges as aforesaid, and utterly disregarding the same, have since the fifteenth day of April, A. D. 1874, and before the filing of this bill of complaint, without the license of your orator, manufactured, used, and sold within the said district of California sundry explosive compounds, each containing and embracing the said inventions and each of them, and still continue and threaten to continue to manufacture hereafter, use, and sell explosive compounds embracing and containing the inventions described in each of said reissued letters patent, numbered 4818, 4819, and 5799, respectively, and so secured to your orator.

What quantity of such explosive compounds the respondents have manufactured, used, or sold your orator is unable to say, but prays that the respondents may discover and set forth in their answer to this
13 bill. And your orator alleges that the explosive compounds made

used, and sold by the respondents are infringements of all of said reissued letters patent, numbered respectively 4818, 4819, and 5799, and were made according to the inventions therein described and thereby protected, and secured to your orator as aforesaid, and contrary to law and the form of the statutes of the United States in such cases made and provided.

And your orator further says, that on or about the 7th day of May, 1872, in a suit in equity brought in the circuit court of the United States for the sixth circuit and eastern district of Michigan, by the said United States Blasting Oil Company, as complainant, against Henry Hinckley and C. M. Wheeler, as defendants, for infringing three of the letters patent aforesaid, bearing date the 19th day of March, 1872, and praying for damages therefor and for an injunction, after due proceedings had and taken, the validity of said letters patent was fully adjudicated, and said court then and there adjudged and decreed the same to be valid in all respects and in full force and virtue; and also for gains and profits, and an injunction as prayed for; which decree has never been reversed,
set aside, or otherwise vacated or impaired, but the same still
14 continues in full force and effect.

And your orator shows that it is informed and believes, and so states to be true, that the respondents in this action intend to continue to infringe upon said last-named letters patent, and to unlawfully manufacture and sell said inventions as they have already been doing.

Your orator further shows that it has requested the respondents to desist from the use of said inventions and to account to your orator for the profits they have made, but that the respondents refuse either to so desist or account.

And your orator further shows unto your honors, that it will be subject to great and irreparable injury unless it shall obtain from your honors the relief hereby sought.

To the end, therefore, that the said respondents may, upon their corporal oath, full, true, direct, and perfect answer make to all and singular the matters hereinbefore stated and charged, as fully and particularly as if the same were hereinafter repeated, and they thereunto distinctly interrogated according to the best of their knowledge, information, and
belief, and more especially that they may answer and set forth:
15 1st. Whether they have not manufactured, used, and sold since the 15th day of April, A. D. 1874, and before the filing of this bill, large quantities of explosive compounds, made by mixing nitroglycerine with absorbents, and how much, and how and of what materials the same are compounded.

2d. Whether they have on hand a large quantity of explosive compounds, composed of nitro-glycerine and absorbents, and how much, and how and of what materials the same are compounded.

And that the said respondents may answer the premises, and that they may be decreed to account for and pay over to your orator all such gains and profits as have or might have accrued to them from purchasing, or making and selling or using such improvements in explosive compounds, and that they may be restrained by an injunction issuing out of this honorable court from making, using, or vending to others to be used, or transferring in any way explosive compounds embracing the improvements aforesaid, so secured to your orator as aforesaid, and that the compounds so manufactured or purchased, or in any manner
obtained by them and now in possession of said respondents, may
16 be destroyed or delivered up to your orator; and that therespondents pay to your orator the damages by him most wrongfully

sustained, and for such other and further relief as the nature of the case may require and to your honors may seem meet: May it please your honors to grant unto your orator, not only a writ of injunction conformable to the prayer of this bill, but also the writ of subpœna directed to the said California Powder Works, John H. Baird, N. G. Kittle, John O. Earl, J. B. Haggin, G. P. Lawton, Thomas Powning, William Wilson, and John Meerlander, commanding them to appear and answer this bill of complaint, and to do and receive what to your honors shall seem meet.

And your orator will ever pray, &c.

ALFRED RIX,
M. A. WHEATON,
Plaintiff's Solicitors.

HALL MCALLISTER,
J. F. COWDERY,
Of Counsel for Plaintiff.

17 STATE OF CALIFORNIA,
City and County of San Francisco:

Geo. C. Hickox, being duly sworn, on his oath says that he is President of the Giant Powder Company, the complainant in the foregoing entitled case; that he has heard the foregoing complaint read and knows the contents thereof, and that the same is true of his own knowledge, except as to the matters therein stated on information or belief, and as to those matters he believes it to be true.

GEO. C. HICKOX.

Subscribed and sworn to before me this 1st day of May, A. D. 1874.
JOS. F. O'BEIRNE,
U. S. Comm'r Cal'a.

(Endorsed:) Filed May 1st, 1874. L. S. B. Sawyer, clerk, by J. F. O'Beirne, deputy clerk.

18 *Subpœna.*

UNITED STATES OF AMERICA:

Circuit court of the United States, ninth circuit, district of California.
In equity.

The President of the United States of America to the California Powder Works, John H. Baird, N. G. Kittle, John O. Earl, J. B. Haggin, G. P. Lawton, Thomas Powning, William Wilson, and John Meerlander, greeting:

You are hereby commanded that you be and appear in said circuit court of the United States aforesaid, at the court-room in San Francisco, on the first Monday of June, A. D. 1874, to answer a bill of complaint exhibited against you in said court by the Giant Powder Company, who is a citizen of the State of California, and to do and receive what
19 the said court shall have considered in that behalf. And this you are not to omit, under the penalty of five thousand dollars.

Witness the honorable M. R. Waite, Chief Justice of the Supreme Court of the United States, this first day of May, in the year of our Lord one thousand eight hundred and seventy-four, and of our Independence the ninety-eighth.

[SEAL.] L. S. B. SAWYER, *Clerk.*

Memorandum, pursuant to Rule 12, Supreme Court U. S.

You are hereby required to enter your appearance in the above suit, on or before the first Monday of June next, at the clerk's office of the said court, pursuant to said bill; otherwise the said bill will be taken pro confesso.

L. S. B. SAWYER, *Clerk.*

(Endorsed:)

U. S. MARSHAL'S OFFICE,
District of California.

20 I hereby certify that I received the within subpœna on the first day of May, A. D. 1874, and personally served the same on the 2d day of May, A. D. 1874, by delivering to and leaving with John O. Earl, Thomas Powning, William Wilson, and John Meerlander, said defendants, each of them personally a certified copy thereof, at the city and county of San Francisco, in said district; and on the 4th day of May, A. D. 1874, personally served the same by delivering to and leaving with N. G. Kittle, John H. Baird, said defendants, each of them personally, a certified copy thereof, and on the California Powder Works, said defendant, by delivering to and leaving with John H. Baird, president of said California Powder Works, personally, a certified copy thereof, at the city and county of San Francisco, in said district; and on 5th day of May, A. D. 1874, personally served the same by delivering to and leaving with J. B. Haggin, said defendant, personally, a certified copy thereof, at the city and county of San Francisco, in said district; and on the 6th day of May, A. D. 1874, personally served the same by delivering to and leaving with G. T. Lawton, said defendant, personally, a certified copy thereof, at the city and county
21 of San Francisco, in said district.

E. P. MARSELLUS,
U. S. Marshal,
By HORACE BACON, *Deputy.*

SAN FRANCISCO, *May 6th*, 1874.

(Endorsed:) Filed 7 May, 1874. L. S. B. Sawyer, clerk.

22 *Demurrer.*

In the circuit court of the United States in and for the district of California, ninth circuit.

THE GIANT POWDER COMPANY
vs.
THE CALIFORNIA POWDER WORKS ET ALS. } In equity.

The demurrer of the defendants, the California Powder Works, John H. Baird, N. G. Kittle, John O. Earl, J. B. Haggin, G. P. Lawton, Thomas Powning, William Wilson, and John Meerlander, to the bill of complaint of the Giant Powder Company, complainant.

These defendants by protestation, not confessing or acknowledging all or any of the matters and things in said complainant's bill contained to be true in such manner and form as the same are therein and thereby set forth and alleged, do demur to said bill, and for cause of demurrer show—

First. That the complainant has not by its said bill made such a case as entitles it (said complainant) in a court of equity to any discovery from

these defendants respectively, or any of them, or to any relief
23 against them, or either or any of them, as to the matters contained in said bill, or any of such matters; and that any discovery which can be made by these defendants, or any of them, touching the matters complained of in said bill, or any of them, cannot be of any avail to said complainant for any of the purposes for which a discovery is sought against these defendants.

Second. That the complainant has not, by its bill of complaint, made such a case as entitles it in a court of equity to any discovery from these defendants, or any of them, or to any relief against them, or either or any of them, as to any matters contained in said bill, with respect to the letters patent mentioned in said bill and numbered 4818; and that any discovery which can be made by these defendants, or any of them, with respect to or touching said matters, cannot be of any avail to complainant for any of the purposes for which a discovery is sought against these defendants.

Third. That the complainant has not, by its bill of complaint, made such a case as entitles it in a court of equity to any discovery from these defendants, or any of them, or to any relief against them, or either or any of them, as to any matters contained in said bill, with respect
24 to the letters patent mentioned in said bill, and numbered 4819; and that any discovery which can be made by these defendants, or any of them, with respect to or touching said matters, cannot be of any avail to complainant for any of the purposes for which a discovery is sought against these defendants.

Fourth. That the complainant has not by its bill of complaint made such a case as entitles it in a court of equity to any discovery from these defendants, or any of them, or to any relief against them, or either or any of them, as to any matters contained in said bill, with respect to the letters patent mentioned in said bill, and numbered 5799, and that any discovery which can be made by these defendants, or any of them, with respect to or touching said matters cannot be of any avail to complainant for any of the purposes for which a discovery is sought against these defendants.

Fifth. That it appears by the said bill that the same is exhibited against these defendants for several and distinct matters and causes, in many whereof, as appears by said bill, these defendants are not in any manner interested or concerned, by reason of which distinct
25 matters the said complainants' bill is drawn out to a considerable length, and these defendants are compelled to take a copy of the whole thereof, and by joining distinct matters together which do not depend on each other in said bill, the pleadings, orders, and proceedings will in the progress of said suit, be intricate and prolix, and these defendants put to unnecessary charges in taking copies of the same.

Sixth. That complainant has joined and united in said bill matters touching three letters patent, numbered respectively 4818, 4819, and 5799, which said matters are, as appears from said bill, entirely separate and distinct. That the matters and claims and demands asserted and set out in said bill, with respect to each of said letters patent, are entirely distinct and unconnected from or with any matters or claims asserted or alleged with regard to the other two letters patent, or either of them.

Seventh. That the matters in said bill with regard to said letters patent No. 4818 are entirely distinct from the matters touching said letters patent No. 4819, as well as those touching said letters patent
26 No. 5799, and each of them.

Eighth. That the matters in said bill with regard to said letters

patent No. 4819 are entirely distinct from the matters touching said letters patent No. 4818, as well as those touching said letters patent No. 5799, and each of them.

Ninth. That the matters in said bill with regard to said letters patent No. 5799 are entirely distinct from the matters touching said letters patent No. 4818, as well as those touching said letters patent No. 4819, and each of them.

Tenth. That said bill is uncertain and ambiguous, among other things in this, that the duration of the terms for which said letters patent respectively were granted is not alleged or stated.

Eleventh. That the part of said bill stated in lines 16 to 24, inclusive, of page 4, and which is as follows: "And your orator further shows unto your honors that the respondents herein, having full knowledge of the premises, and in violation of your orator's exclusive rights, liberties, and privileges as aforesaid, and utterly disregarding the same, have, since the fifteenth day of April, A. D. 1874, and before the filing of this bill of complaint, without the license of your orator, manufactured,
27 used, and sold within the said district of California, sundry explosive compounds, each containing and embracing the said inventions, and each of them, and still continue and threaten to continue to manufacture hereafter, use, and sell explosive compounds, embracing and containing the inventions described in each of said reissued letters patent numbered 4818, 4819, and 5799, respectively, and so secured to your orator," is uncertain, ambiguous, and unintelligible, among other things in this, that it is not alleged, nor does it appear what kind of explosive compounds are manufactured, used or sold by these defendants, or how each of such explosive compounds do, or can embrace or contain all the alleged inventions, and each of them, mentioned in the said three letters patent.

Twelfth. That the part of said bill stated in lines 27 to 31, inclusive, of said page 4, and which is as follows: "And your orator alleges that the explosive compounds made, used, and sold by the respondents are infringements of all of said reissued letters patent numbered respectively 4818, 4819, and 5799, and were made according to the inventions therein described, and thereby protected and secured to your orator as
28 aforesaid, and contrary to law and the form of the statutes of the United States in such cases made and provided," is uncertain, ambiguous, and unintelligible, among other things in this, that it is not alleged, nor does it appear what kind of explosive compounds are made, used or sold by these defendants, nor how said compounds are or can be infringements of all or any of said letters patent numbered respectively 4818, 4819, and 5799.

Thirteenth. That as appears from said bill, the complainant has no right in equity to propound or to have defendants answer the first interrogatory in said bill contained, for the reason, among others, that said interrogatory embraces matters not mentioned in said bill, and it does not appear that the manufacture, use or sale of compounds made by mixing nitro-glycerine with absorbents is an infringement of any exclusive rights claimed to be secured to complainant by said letters patent.

Fourteenth. That it appears from said bill the complainant has no right in equity to propound, or to have defendants answer the second interrogatory in said bill contained, for the reason, among others, that said interrogatory embraces matters not mentioned in said bill,
29 and that compounds made by mixing nitro glycerine with absorb-

ents do not infringe any rights of complainant, as alleged and set out in the said bill.

GREATHOUSE & HAGGIN,
Solicitors for the Defendants.

WILSON & WILSON AND W. W. COPE,
Of Counsel for Defendants.

We hereby certify that in our opinion the foregoing demurrer is well founded in point of law.

C. R. GREATHOUSE,
L. T. HAGGIN,
Solicitors for the Defendants.

WILSON & WILSON AND W. W. COPE.
Of Counsel for Defendants.

STATE OF CALIFORNIA,
City and County of San Francisco:

J. R. Haggin, being duly sworn, says that he is one of the defendants in the above entitled cause, and that the foregoing demurrer is not interposed for delay.

J. B. HAGGIN.

30 Subscribed and sworn to before me this 18th day of August, A. D. 1874.

[SEAL.] E. H. THARP,
Notary Public.

(Endorsed:)

Due service of the within demurrer admitted this 18th day of August, 1874.

M. A. WHEATON &
ALFRED RIX,
Plaintiffs' Solicitors.

Filed August 18th, 1874.

L. S. B. SAWYER, *Clerk*,
By J. F. O'BEIRNE,
Deputy Clerk.

31 *Amended complaint.*

Bill of complaint.

To the honorable the justices of the circuit court of the United States for the ninth circuit, within and for the district of California, sitting in equity:

The Giant Powder Company, a corporation created and existing under the laws of the State of California, and having its principal place of business in the city and county of San Francisco, in said State, brings this its bill against the California Powder Works, John H. Baird, N. G. Kittle, John O. Earl, J. B. Haggin, C. P. Lawton, Thomas Powning, William Wilson, and John Meerlander.

And thereupon your orator complains and says: That heretofore, to wit, before the sixteenth day of September, in the year one thousand eight hundred and sixty-five, Alfred Nobel, of Hamburg, in Germany, was the original and first inventor of certain new and useful discoveries

and inventions in the arts of manufacturing nitro-glycerine and using it as a practical explosive agent. That the same were new and
32 useful inventions, and consisted of an improved process for manufacturing nitro-glycerine; also, forming a new explosive compound by mixing nitro-glycerine with gunpowder; also, forming a new explosive compound by mixing nitro-glycerine with gun-cotton, and the mixture of rocket-powder with nitro-glycerine; also, exploding nitro-glycerine by detonation; also, the application and use of percussion-caps and other exploders to produce the necessary detonation for exploding nitro-glycerine. That the same were not known or used before his said inventions, and had not at the time of his application for a patent been in use or on sale with his consent or allowance for two years.

That the said Alfred Nobel, being so as aforesaid the inventor thereof, on the sixteenth day of September, A. D. 1865, duly filed in the United States Patent Office an application for a patent, addressed to the Commissioner of Patents, praying for letters-patent for his said invention; and with said petition said Nobel filed in said Patent Office a power of attorney appointing and constituting Henry Howson his attorney and agent to alter and modify the specifications and drawings in his said application, to receive the patent, etc. That, with said application for a patent, said Nobel duly filed his specifications and
33 drawings describing his said invention, a copy of which specifications and drawings is hereto annexed marked "Exhibit A," and made a part of this amended bill of complaint.

That on the same day, to wit, on the sixteenth day of September, 1865, the said Howson filed in the said Patent Office amendments to said specifications and drawings, which amendments were made in part by striking out a portion of the said specifications filed by Nobel; and on the 24th day of October, 1865, upon said application therefor, the said Nobel did obtain letters patent with said amended specifications for the said inventions, which said letters patent were granted for the term of seventeen years from their date, were issued in due form of the law under the seal of the Patent Office of the United States, and were signed by the Secretary of the Interior, and countersigned by the Commissioner of Patents of the United States, and bore date the day and year last aforesaid, and were numbered 50617. A copy of said letters patent are now on file in this action, and are hereby referred to and made a part hereof.

That afterwards, to wit, on or about the 27th day of July, 1866, by an instrument in writing of that date, the said Alfred Nobel assigned and transferred to the United States Blasting-Oil Company, a corpo-
34 ration created and existing under the laws of the State of New York, and having its principal place of business in the city and county and State of New York, the said letters patent, and all his right, title, and interest in or under the same, as well as in and to the inventions aforesaid.

That afterwards, to wit, on the 13th day of April, 1869, upon due application therefor, and upon the surrender to the Commissioner of Patents of the letters patent aforesaid, four new divisional letters patent were duly issued to the said United States Blasting-Oil Company for the same inventions for the residue of the period then unexpired, for which the said original patent was granted, and were numbered and designated as follows, to wit: Reissue No. 3377, division A, and was for the said method of exploding nitro-glycerine by detonation; reissue No. 3378, division B, and was for the application and use of percussion-caps and other exploders, to create the detonation necessary to explode the

nitro-glycerine; reissue No. 3379, division C, and was for the improved mode of manufacturing nitro-glycerine; reissue No. 3380, division D, and was for the new explosive compounds invented by said Nobel,
35 viz, the mixture of gunpowder and nitro-glycerine and the mixture of gun-cotton and nitro-glycerine, and the mixture of rocket-powder with nitro-glycerine.

That each of the four letters-patent last named was dated April 13th, 1869, and issued in due form of law, under the seal of the Patent Office, signed by the Acting Secretary of the Interior, and countersigned by the Commissioner of Patents, and delivered to the said United States Blasting-Oil Company, and were for the residue of the term aforesaid.

That afterwards, to wit, on the 19th day of March, 1872, upon due application therefor, and upon the surrender to the Commissioner of Patents of one of the four divisional letters-patent last above described, to wit, the said "Reissue 3380, Division D," two new divisional letters-patent for the same inventions for the residue of the period then unexpired for which the said original patent was granted, were duly issued to the said United States Blasting-Oil Company, and were numbered and designated as follows, to wit: Reissue No. 4818, Division D, for the mixture of gunpowder with nitro-glycerine, and Reissue No. 4819, Division E, for the mixture of rocket powder with nitro-glycerine.

36 That each of the two letters-patent last named was dated March 19, 1872, and was in due form of law issued under the seal of the Patent Office, signed by the Acting Secretary of the Interior, and countersigned by the Commissioner of Patents, and delivered to the said United States Blasting-Oil Company.

That in and by each of the two last-named letters-patent, there was secured to the said United States Blasting-Oil Company, and to its successors and assigns, for the residue of the term aforesaid, the full and exclusive right of making, using, and vending to others to be used, the invention, to wit, the explosive compound therein described respectively.

That afterwards, to wit, on or about the 12th day of April, 1873, by an instrument in writing of that date, the said United States Blasting-Oil Company duly assigned and transferred to the Atlantic Giant Powder Company, a corporation created and existing under the laws of the State of California, and having its principal place of business in the city and county of San Francisco, and State aforesaid, the two reissued letters-patent last above described, and all the rights, liberties, and privileges by them granted and conferred, and the inven-
37 tions therein mentioned.

And afterwards, to wit, on or about the 15th day of April, 1874, by an instrument in writing of that date, the said Atlantic Giant-Powder Company duly assigned and transferred to your orator said last-named letters-patent, to wit, Reissue No. 4818, Division D, and Reissue No. 4819, Division E, within, for, and throughout the States of California, Nevada, Oregon, and all those States and Territories of the United States which lie west of the easterly boundary lines of the Territories of Montana, Wyoming, Colorado, and New Mexico, and all the rights, liberties, and privileges by them granted and conferred, and the inventions therein mentioned.

And your orator further shows that before the 26th day of May, 1868, the said Alfred Nobel was the original and first inventor of a certain new and useful composition of matter, being a combination or mixture of nitro-glycerine with porous or absorbent substances, whereby a compound is formed, now generally known as dynamite or giant-powder,

which is very effective as an explosive agent, and is at the same time far more safe and convenient for handling, transportation, stor-
38 age, and use than nitro-glycerine, in its ordinary condition as a liquid.

That the same was not known or used before the invention thereof by the said Nobel as aforesaid, and had not been at the time of his application for letters-patent therefor in use or on sale for two years.

That said Nobel, being so as aforesaid the inventor of said composition of matter, made application in due form of law for letters-patent therefor, and having complied in all respects with the conditions and requisitions of the laws then in force, on the 26th day of May, 1868, letters-patent of the United States, the same being No. 78317, dated the day and year aforesaid, sealed with the seal of the Patent Office, signed by the Acting Secretary of the Interior, and countersigned by the Commissioner of Patents, and otherwise executed and attested in due form of law, were issued for the said invention.

That on or about the 4th day of April, 1868, and after the making of said invention, and before the application for letters-patent therefor as aforesaid, the said Nobel, by an instrument in writing, sold, assigned, and transferred to one Julius Bandmann, of the city and county of San Francisco aforesaid, the said invention, together with all his
39 right, title, and interest in or to the same, as well as in or to the letters-patent that might be issued therefor; and the said assignment having been duly recorded in the Patent Office, the letters-patent aforesaid were granted and issued to said Bandmann, and were for the term of seventeen years from their date.

That afterwards, to wit, in the month of June, A. D. 1868, the said Julius Bandmann assigned and conveyed to your orator, the Giant-Powder Company, the last-mentioned invention and letters-patent, bearing date on the twenty sixth day of May, A. D. 1868. All the assignments mentioned in this bill of complaint were in writing, and were duly recorded in the Patent Office prior to the commencement of this action.

That afterwards, to wit, on the 21st day of October, A. D. 1873, upon due application therefor, and upon the surrender to the Commissioner of Patents of the United States of the letters-patent last aforesaid, new letters-patent were duly issued to your orator for the same invention for the residue of the period then unexpired for which the said original patent was granted; that the letters-patent so reissued were is-
40 sued in due form of law, under the seal of said Patent Office, and were signed by the Acting Secretary of the Interior, and countersigned by the Commissioner of Patents, and were dated the day and year last aforesaid, and were delivered to your orator, the same being designated as Reissue No. 5619.

That afterwards, to wit, on the 17th day of March, A. D. 1874, upon due application therefor, and upon the surrender to the Commissioner of Patents of the United States of the letters-patent last aforesaid, new letters-patent were duly issued to your orator for the same invention for the residue of the period then unexpired for which the said original patent was granted; that the letters-patent so reissued were issued in due form of law, under the seal of said Patent Office, and were signed by the Acting Secretary of the Interior, and countersigned by the Commissioner of Patents, and were dated the day and year last aforesaid, and were delivered to your orator, the same being designated as Reissue No. 5799, whereby there was secured to your orator and its successors and assigns, for the term aforesaid, the full and exclusive right

of making, using, and vending to others to be used, the invention therein described.

41 That prior to the issuing of said original letters-patent, as well as prior to the issuing of each of the re-issues aforesaid, all proceedings were had and taken which were required by law to be had and taken previous to the issuance or re issuance, respectively, of letters-patent, granting special rights and liberties for new and useful inventions. And your orator says that within, for, and throughout all those States and Territories which lie west of the easterly boundary lines of the Territories of Montana, Wyoming, Colorado, and New Mexico, including the States of California, Nevada and Oregon, your orator is still the owner and holder of three of the re issued letters-patent hereinbefore described, to wit, re issue No. 4818, Division D, dated March 19, 1872; re-issue No. 4819, Division E, dated March 19, 1872; and re-issue No. 5799, dated March 17, 1874, and of all the rights, privileges and liberties by them granted. Said last mentioned three re issues are now on file in this action, and are hereby referred to and made a part of this bill of complaint.

And your orator further shows unto your honors, that always since the said inventions were made, and said letters-patent issued, the said

42 Alfred Nobel and his assignees, each, during the times, respectively, that each was the owner thereof, have been in the exercise of the full and exclusive rights and liberties so granted as aforesaid by said letters-patent, and have made, constructed, used and vended to others to be used, the said inventions and each of them so patented, and have had and maintained, until the infringements hereinafter complained of, the possession of the said inventions under and by virtue of said letters-patent, and have never acquiesced in any invasion or infringement of any of their said rights.

And your orator further shows unto your honors, that the respondents herein, having full knowledge of the premises, and in violation of your orator's exclusive rights, liberties and privileges as aforesaid, and utterly disregarding the same, have, since the fifteenth day of April, A. D. 1874, and before this filing of this bill of complaint, without the license of your orator, manufactured, used, and sold, within the said district of California, sundry explosive compounds, each containing and embracing the said inventions and each of them, and still continue

43 and threaten to continue to manufacture hereafter, use, and sell explosive compounds, embracing and containing the inventions described in each of said re-issued letters-patent, numbered 4818, 4819 and 5799, respectively, and so secured to your orator.

What quantity of such explosive compounds the respondents have manufactured, used or sold, your orator is unable to say, but prays that the respondents may discover and set forth in their answer to this bill. And your orator alleges that the explosive compounds made, used, and sold by the respondents, are infringements of all of said re-issued letters-patent numbered respectively 4818, 4819 and 5799, and were made according to the inventions therein described and thereby protected, and secured to your orator as aforesaid, and contrary to law and the the form of the statutes of the United States in such cases made and provided.

And your orator further says, that on or about the 7th day of May, 1872, in a suit in equity brought in the circuit court of the United States for the sixth circuit and eastern district of Michigan, by the said United States Blasting Oil Company, as complainant, against Henry

44 Hinckley and C. M. Wheeler, as defendants, for infringing three

of the letters-patent aforesaid, bearing date the 19th day of March, 1872, and praying for damages therefor and for an injunction, after due proceedings had and taken, the validity of said letters-patent was fully adjudicated, and said court then and there adjudged and decreed the same to be valid in all respects, and in full force and virtue, and also for gains and profits, and an injunction as prayed for, which decree has never been reversed, set aside, or otherwise vacated or impaired, but the same still continues in full force and effect.

And your orator shows that it is informed and believes, and so states to be true, that the respondents in this action intend to continue to infringe upon said last three named re-issued letters-patent, and to unlawfully manufacture and sell said inventions, as they have already been doing.

Your orator further shows that it has requested the respondents to desist from the use of said inventions, and to account to your orator for the profits they have made, but that the respondents refuse either to so desist or account.

45 And your orator further shows unto your honors, that it will be subject to great and irreparable injury, unless it shall obtain from your honors the relief hereby sought.

To the end, therefore, that the said respondents may, upon their corporal oath, full, true, direct and perfect answer make to all and singular the matters hereinbefore stated and charged, as fully and particularly as if the same were hereinafter repeated, and they thereunto distinctly interrogated according to the best of their knowledge, information, and belief, and more specially that they may answer and set forth—

1st. Whether they have not manufactured, used and sold since the 15th of April, A. D. 1874, and before the filing of this bill, large quantities of explosive compounds, made by mixing nitro-glycerine with absorbents, and how much and how, and of what materials the same are compounded.

2d. Whether they have on hand a large quantity of explosive compounds composed of nitro-glycerine and absorbents, and how much, and how, and of what materials the same are compounded.

46 And that the said respondents may answer the premises, and they may be decreed to account for and pay over to your orator all such gains and profits as have or might have accrued to them from purchasing or making and selling or using such improvements in explosive compounds, and that they may be restrained by an injunction issuing out of this honorable court, from making, using or vending to others to be used, or transferring in any way explosive compounds, embracing the improvements aforesaid, so secured to your orator as aforesaid, and that the compounds so manufactured or purchased, or in any manner obtained by them, and now in possession of said respondents, may be destroyed or delivered up to your orator, and that the respondents pay to your orator the damages by it most wrongfully sustained, and for such other and further relief as the nature of the case may require, and to your honors may seem meet: May it please your honors to grant unto your orator, not only a writ of injunction conformable to the prayer of this bill, but also the writ of subpœna directed to the said

47 The California Powder Works, John H. Baird, N. G. Kittle, John O. Earl, J. B. Haggin, G. P. Lawton, Thomas Powning, William Wilson and John Meerlander, commanding them to appear and

answer this bill of complaint, and to do and receive what to your honors shall seem meet.

And your orator will ever pray, &c.

M. A. WHEATON &
ALFRED RIX,
Plaintiff's Solicitors.

McALLISTERS & BERGIN,
Of Counsel for Plaintiff.

STATE OF CALIFORNIA,
City and County of San Francisco:

Albert Dibblee, being duly sworn, on his oath says: That he is president of the Giant Powder Company, the complainant in the foregoing case; that he has heard the foregoing complaint read and knows the contents thereof, and that the same is true of his own knowledge, except as to the matters therein stated on information or belief, and as to those matters he believes it to be true.

ALBERT DIBBLEE.

Subscribed and sworn to before me the twenty-fifth day of January, A. D. 1875.

L. S. B. SAWYER,
U. S. Commissioner, Dist. of Cal'a.

48 EXHIBIT A.

Memorandum relating to Alfred Nobel's invention for the use of nitro glycerine and analogous substances as substitutes for gunpowder.

There is a class of substances long known, but not applied as yet to technical purposes, in consequence of practical difficulties in promotin g their explosion; such are nitro-glycerine, the nitrates of etyl and methyl, nitromanite, etc.

The peculiar property which distinguishes this class of substances is that fire may be applied to them without their exploding.

Thus nitro-glycerine if ignited in an open space is slowly decomposed with a bluish flame, but the fire goes out when the match is withdrawn; hence nitro-glycerine cannot under ordinary circumstances be looked upon as a ready explosive agent, for while gunpowder and other explosive substances hitherto used always explode when fire is set to them, nitro-
glycerine, on the other hand, and analogous substances, must be
49 heated to the degree of their detonation in order to explode.

If a drop of nitro-glycerine is poured upon an anvil, the blow of a hammer, through the heat developed by compression, causes it to explode, but only that part which has received the blow, so that the explosion in this case is only a local one.

A chief point in my invention consists in overcoming this difficulty. According as nitro-glycerine is to be used for fire-arms or for blasting, I adopt two different methods for promoting its explosion, viz:

I METHOD.

By mixing it with gunpowder, gun-cotton, or any other substance developing a rapid heat, nitro-glycerine, being an oil, fills the pores of gunpowder and is heated by the latter to the degree of its explosion. Gunpowder treated in this way can take up from 10 to 50 per cent. of

nitro-glycerine, and develops a greater power with a lesser quickness of explosion.

Where the only object in view is to reduce the quickness of explosion of gunpowder, I mix it with or make it absorb common non-ex-
50 plosive oil from 1 to ten per cent. of its weight.

II METHOD.

When nitro-glycerine is to be used for blasting where quickness of explosion is of great importance, I submit it to the most rapid source of heat known, viz, that developed by pressure. To effect this I make use of the pressure developed by heating a minute portion of nitro-glycerine, or by the detonation of any other violently exploding substance.

Nitro-glycerine being a liquid, if it cannot escape, as for instance in a bore, receives and propagates the initial pressure through its whole mass, and is by that pressure instantaneously heated; hence the first impulse of explosion decomposes the rest.

There are many means of attaining this impulse of explosion, such as—

1. When nitro-glycerine in tubes is surrounded by gunpowder, or vice versa.

2. By the spark or heat developed by a strong electric current when the nitro-glycerine is enclosed on all sides, so as not to afford an escape to the gas developed.

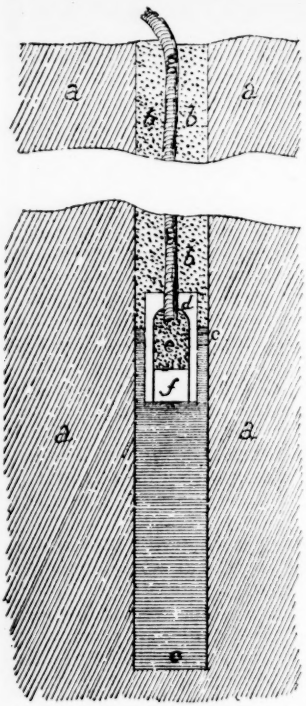
3. By a capsule.

4. By any chemical agents developing a gradual heat through
51 which the initial explosion of nitro-glycerine or some other violently-exploding substance may take place.

5. Simply by a fuse. This will do in a closed space and under sufficient resistance, but if the gases of decomposed nitro-glycerine are enabled to escape before they accumulate to such a pressure as to effect the requisite impulse of explosion, the nitro-glycerine is slowly decomposed, and the fire generally goes out before the whole is consumed.

6. By what I call "igniters." They may be greatly varied, but in their simplest form they consist of a wooden cylinder, hollow inside and filled with gunpowder, being corked at one end and connected with a fuse at the other. When the nitro-glycerine has been poured into the bore this cylinder is let down with its fuse until the former swims in the blasting oil; then the upper part of the bore is filled with loose sand, and nothing remains but to ignite the fuse. The fuse in its turn fires the gunpowder contained in the wooden cylinder, the hot gases of the gunpowder make their escape, and rush in streams into the blasting oil, of which they heat a minute part; a local detonation takes place
52 which, as the oil cannot escape, heats it by pressure to about 360° Fahrenheit, when it explodes through the whole mass.

These igniters are the instruments of which I chiefly make use for causing the nitro-glycerine to explode.



a a a a, shows the rock.
b b, a bore.
c c, the nitro-glycerine.
d d, the wooden cylinder (igniter).
e, the charge of gunpowder.
f, the cork.
g g, the fuse.
h h, a shaft of loose sand.

In consideration, therefore—

1. That nitro-glycerine and analogous substances, to which fire can be applied without causing their explosion, are known for many years without having been applied to any practical use in consequence of practical difficulties in promoting their explosion;

2. That they can be fired without exploding, therein differing from all other explosive substance hitherto used;

3. That even the blow of a hammer causes only a local explosion;

53 4. That I have introduced these substances from the domain of science into that of practical life; and,

5. That explosive substances liquid at the ordinary temperature have not as yet been applied to any technical use—

I claim as my invention:

1. The use of gunpowder or similar substances when mixed with nitro-glycerine or analogous substances.

2. The reduction of the quickness of explosion of gunpowder, by mixing it with oily, explosive, or non-explosive substances.

3. The effecting the detonation of nitro-glycerine, or analogous substances (which can be ignited without exploding) by the heat developed by pressures, promoting an impulse of explosion which decomposes the rest.

4. The exclusive use of nitro-glycerine and the class of substances described above, or mixtures of such as far as their application may

be classed under any of the methods indicated in this memorandum.

Besides this, I claim as my own the following improvement in the preparation of nitro-glycerine:

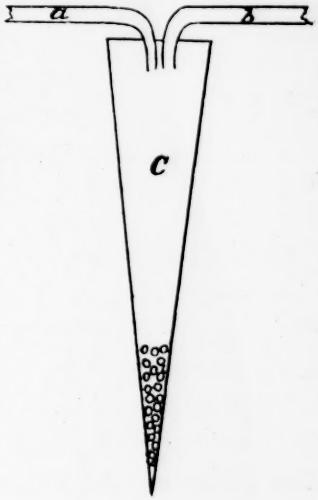
54 Hitherto it was prepared only in laboratories, and by adding glycerine, drop by drop, to a mixture of sulphuric and nitric acid, and taking care not to raise the temperature above 32° Fahrenheit.

My chief improvement on the method consists in coiling up within the vessel containing the acid, a long spiral tube, either leaden or stone ware, through which cold water is led. Thus a rapid cooling of the acids allows of a very rapid addition of glycerine, and consequently of a rapid preparation of nitro-glycerine. Another method consists in rapidly mixing the whole relative quantities of acids and glycerine, when, being led immediately into cold water, the nitro-glycerine separates, being insoluble:

a is a tube conducting the mixture of nitric and sulphuric acids into the mixing tube *c*.

b, a tube conducting glycerine into the mixing tube *c*.

c, a mixing tube wherein the reaction takes place, and provided with small holes at the bottom, whence the mixture of acids and nitro-glycerine escapes into cold water.



55 In testimony whereof I have signed my name to this specification before two subscribing witnesses.

Hamburg, the 24th of May, 1865.

ALFRED NOBEL.

Signed and delivered in the presence of—
FR. P. V. OHME.
AD. RITTER.

No. 4314.

[Vier Schilling.]

24TH MAY, 1865.

CITY AND STATE OF HAMBURG:

On this twenty-fourth day of May, A. D. one thousand eight hundred and sixty-five, before me, Edward Schramm, doctor of laws, a notary public in and for the said city, personally appeared M'r Alfred Nobel, to me known to be the individual described in and who executed the

foregoing instrument, and acknowledged that he executed the same freely and voluntarily, for the uses and purposes therein mentioned.

56 In witness whereof I have hereunto set my hand and affixed my official seal the day and year last above written.

DR. EDWARD SCHRAMM, NOTARIATS STAGLA, HAMBURG. SCHRAMM, *Dr.*

No. 783.

UNITED STATES CONSULATE.

On this twenty-sixth day of May, 1865, before the subscriber, a United States consul, personally appeared the within-named Alfred Nobel, and made solemn oath that he verily believes himself to be the original and first inventor of the herein-described use of nitro-glycerine and analogous substances as substitute for gunpowder; that he does not know or believe that the same was ever before known or used, and that he is a citizen of Hamburg.

[AMERICAN CONSULATE SEAL.] JAMES R. McDONALD,
U. S. & 2d. Acting Consul.

[5. H. H. Sept. 13, 1865. 5.]

(Endorsed:)

Service of a copy admitted this 25th day of January, A. D.
57 1875.

GREATHOUSE & HAGGIN,
Atty's for Def'ts.

Filed 25 January, 1875.

L. S. B. SAWYER, *Clerk.*

58 *Exceptions to bill of complaint for impertinence.*

In the circuit court of the United States in and for the district of California, ninth circuit.

THE GIANT POWDER COMPANY *vs.* THE CALIFORNIA POWDER WORKS ET AL. } In equity.

Exceptions taken by the defendants to the bill of complaint in this cause for impertinence.

For that the said bill is impertinent from and including the words "and with" in line 22 of page 2, to and including "ect." in line 26 of said page; also from and including the words "that with" on said line 26 of said page, to and including the word "invention" in line 28 of said page; also from and including words "a copy" in said line 28, to and including word "complaint" in line 30 of said page; also from and including words "that on" in said line 30, to and including word "Nobel" in line 4 of page 3; also from and including word "upon" in line 4 of said page 3, to and including word "therefore" in line 5 of said
59 page 3; also from and including word "with" in line 6 of said page, to and including word "specifications" in said last-named line; also all of pages 14, 15, 16, 17, 18, 19, 20, of said bill, being Exhibit A attached to and filed with said bill.

In which particulars these defendants except to said bill as imperti-

nent and humbly insist that the same, and each and every part thereof, ought to be expunged from said bill.

GREATHOUSE & HAGGIN,
Solicitors for Defendants.

WILSON & WILSON and W. W. COPE,
Of Counsel.

(Endorsed:)
Service of the within admitted this 18th day of February, 1875.
M. A. WHEATON and
McALLISTERS & BERGIN,
Solicitors for Compl'ts.

Filed Feb'y 18, 1875.

L. S. B. SAWYER, *Clerk.*
By J. F. O'BEIRNE,
Deputy Clerk.

60 *Demurrer to the am'aded bill of complaint.*

In the circuit court of the United States in and for the district of California, ninth circuit.

THE GIANT POWDER COMPANY
vs.
THE CALIFORNIA POWDER WORKS ET ALS. } In equity.

The demurrer of the defendants, the Calfornia Powder Works, John H. Baird, N. G. Kittle, John O. Earl, J. B. Haggin, G. P. Lawton, Thomas Powning, William Wilson, and John Meerlander, to the amended bill of complaint of the Giant Powder Company, complainant.

These defendants, by protestation, not confessing or acknowledging all or any of the matters and things in said complainants' bill contained to be true in such manner and form as the same are therein and thereby set forth and alleged, do demur to said bill and for cause of demurrer show—

First. That the complainant has not by its said bill made such a case as entitles it (said complainant) in a court of equity to any discovery from these defendants respectively, or any of them, or to any
61 relief against them, or either or any of them, as to the matters contained in said bill, or any of such matters, and that any discovery which can be made by these defendants, or any of them, touching the matters complained of in said bill, or any of them, cannot be of any avail to said complainant for any of the purposes for which a discovery is sought against these defendants.

Second. That the complainant has not by its bill of complaint made such case as entitles it in a court of equity to any discovery from these defendants, or any of them, or to any relief against them, or either or any of them, as to any matters contained in said bill with respect to the letters-patent mentioned in said bill and numbered 4818, and that any discovery which can be made by these defendants, or any of them, with respect to or touching said matters, cannot be of any avail to complainant for any of the purposes for which a discovery is sought against these defendants.

Third. That the complainant has not by its bill of complaint made such a case as entitles it in a court of equity to any discovery from these

defendants, or any of them, or to any relief against them, or
62 either or any of them, as to any matters contained in said bill with respect to the letters-patent mentioned in said bill and numbered 4819, and that any discovery which can be made by these defendants, or any of them, with respect to or touching said matters, cannot be of any avail to complainant for any of the purposes for which a discovery is sought against these defendants.

Fourth. That the complainant has not by its bill of complaint made such a case as entitles it in a court of equity to any discovery from these defendants, or any of them, or to any relief against them, or either or any of them, as to any matters contained in said bill with respect to the letters-patent mentioned in said bill and numbered 5799, and that any discovery which can be made by these defendants, or any of them, with respect to or touching said matters, cannot be of any avail to complainant for any of the purposes for which a discovery is sought against these defendants.

Fifth. That it appears by the said bill that the same is exhibited against these defendants for several and distinct matters and causes, in many whereof, as appears by said bill, these defendants
63 are not in any manner interested or concerned, by reason of which distinct matters the said complainants' bill is drawn out to a considerable length and these defendants are compelled to take a copy of the whole thereof, and by joining distinct matters together which do not depend on each other in said bill, the pleadings, orders, and proceedings will in the progress of said suit be intricate and prolix, and these defendants put to unnecessary charges in taking copies of the same.

Sixth. That complainant has joined and united in said bill matters touching three letters-patent, numbered respectively 4818, 4819, and 5799, which said matters are, as appears from said bill, entirely separate and distinct. That the matters and claims and demands asserted and set out in said bill, with respect to each of said letters-patent, are entirely distinct and unconnected from or with any matters or claims asserted or alleged with regard to the other two letters-patent, or either of them.

Seventh. That the matters in said bill with regard to said letters-patent No. 4818, are entirely distinct from the matter touching
64 said letters-patent No. 4819, as well as those touching said letters-patent No. 5799 and each of them.

Eighth. That the matters in said bill, with regard to said letters patent No. 4819, are entirely distinct from the matters touching said letters patent No. 4818, as well as those touching said letters patent No. 5799, and each of them.

Ninth. That the matters in said bill, with regard to said letters patent No. 5799, are entirely distinct from the matters touching said letters patent No. 4818, as well as those touching said letters patent No. 4819, and each of them.

Tenth. That said bill is uncertain and ambiguous; among other things, in this, that the duration of the terms for which said letters patent respectively were granted is not alleged or stated.

Eleventh. That the part of said bill stated in lines 8 to 21, inclusive, of page 9, and which is as follows: "And your orator further shows unto your honors that the respondents herein, having full knowledge of the premises, and in violation of your orator's exclusive rights, liberties, and privileges, as aforesaid, and utterly disregarding the same, have since the fifteenth day of April, A. D. 1874, and before the filing of this
65 bill of complaint, without the license of your orator, manufactured, used, and sold within the said district of California sundry explo-

sive compounds, each containing and embracing the said inventions, and each of them, and still continue and threaten to continue to manufacture hereafter, use, and sell explosive compounds embracing and containing the invention described in each of said reissued letters patent numbered 4818, 4819, and 5799, respectively, and so secured to your orator," is uncertain, ambiguous, and unintelligible; among other things, in this, that it is not alleged, nor does it appear, what kind of explosive compounds are manufactured, used, or sold by these defendants, or how each of such explosive compounds do or can embrace or contain all the alleged inventions and each of them mentioned in the said three letters patent.

Twelfth. That the part of said bill stated in lines 25 to 32, inclusive, of said page 9, and which is as follows: "And your orator alleges that the explosive compounds made, used, and sold by the respondents are infringements of all of said reissued letters patent numbered respectively
66 4818, 4819, and 5799, and were made according to the inventions therein described, and thereby protected and secured to your orator, as aforesaid, and contrary to law and the form of the statutes of the United States in such cases made and provided," is uncertain, ambiguous, and unintelligible; among other things, in this, that it is not alleged, nor does it appear, what kind of explosive compounds are made, used, or sold by these defendants, nor how said compounds are, or can be, infringements of all or any of said letters patent numbered respectively 4818, 4819, and 5799.

Thirteenth. That, as appears from said bill, the complainant has no right in equity to propound, or to have defendants answer, the first interrogatory in said bill contained, for the reason, among others, that said interrogatory embraces matters not mentioned in said bill, and it does not appear that the manufacture, use, or sale of compounds made by mixing nitro-glycerine with absorbents is an infringement of any exclusive rights claimed to be secured to complainant by said letters patent.

Fourteenth. That it appears from said bill the complainant has no right in equity to propound, or to have defendants answer, the second interrogatory in said bill contained, for the reason, among others,
67 that said interrogatory embraces matters not mentioned in said bill, and that compounds made by mixing nitro-glycerine with absorbents do not infringe any rights of complainant, as alleged and set out in the said bill.

GREATHOUSE & HAGGIN,
Solicitors for the Defendants.

WILSON & WILSON & W. W. COPE,
Of Counsel for Defendants.

We hereby certify that in our opinion the foregoing demurrer is well-founded in point of law.

GREATHOUSE & HAGGIN,
Solicitors for the Defendants.

W. W. COPE & WILSON & WILSON,
Of Counsel for Defendants.

STATE OF CALIFORNIA,
City and County of San Francisco:

J. B. Haggin, being duly sworn, says that he is one of the defendants in the above-entitled cause, and that the foregoing demurrer is not interposed for delay.

J. B. HAGGIN.

68 Subscribed and sworn to before me this fifth day of June, A. D. 1875.

[SEAL.] E. H. THORP,
Notary Public.

(Endorsed:)

Due service of the within demurrer admitted this fifth day of June, 1875.

ALFRED RIX,
McALLISTERS & BERGIN,
M. A. WHEATON,
Plaintiff's Solicitors.

Filed June 5th, 1875.

L. S. B. SAWYER,
Clerk.
By J. F. O'BEIRNE,
Deputy Clerk.

69 *Enrollment.*

At a stated term of the circuit court of the United States of America for the district of California, in the ninth judicial circuit, held at the court-room thereof in the city and county of San Francisco on Monday, the 18th day of October, A. D. 1875.

Present, Hon. L. Sawyer, circuit judge.

THE GIANT POWDER COMPANY, COMPLAINANT,
vs.
THE CALIFORNIA POWDER WORKS ET AL., RESPONDENTS. } In equity.

The complainant filed its bill of complaint, which is hereto annexed, against the defendants, The California Powder Works, John H. Baird, N. G. Kittle, John O. Earl, J. B. Haggin, G. P. Lawton, Thomas Powning, William Wilson, and John Meerlander, on the 1st day of May, A. D. 1874.

Thereupon a subpœna to appear and answer herein was issued, returnable on the first Monday of June, A. D. 1874, and was personally
70 served on each and all of said defendants prior to the return day thereof. Said subpœna, with the marshal's return thereon indorsed, is hereto annexed.

The defendants appeared herein by Mess'rs Greathouse & Haggin, and Wilson and Wilson, their solicitors.

On the 3rd day of August, A. D. 1874, an order was made and entered herein directing that complainant file, as part of its bill of complaint, copies of certain letters patent, which order is in the words and figures following, to wit:

At a stated term of the circuit court of the United States of America, of the ninth judicial circuit, in and for the district of California, held at the court-room in the city of Francisco, on Monday, the 3rd day of August, in the year of our Lord one thousand eight hundred and seventy-four.

Present, the honorable Lorenzo Sawyer, judge.

71 *Order that compl't file copies of letters patent.*

THE GIANT POWDER COMPANY
vs.
THE CALIFORNIA POWDER WORKS ET AL.

The order for the complainant to show cause why it should not file, as part of the bill of complaint herein, copies of the several letters patent mentioned in said bill having been duly served on the complainant, and having come on regularly for hearing before the court, C. R. Greathouse, esq., appearing as solicitor for defendants, and Hall McAllister, esq., as the solicitor for the complainant, on motion of the solicitor for the defendants and by consent of all parties, it is ordered that the complainant file on or before Friday, the seventh day of August, 1874, as parts of its bill of complaint herein, copies of the several letters patent mentioned and described in the bill, and of which profert is therein made; and it is further ordered that defendants have five days from and after said copies of letters patent are filed as above ordered in which to demur, plead, or answer to the said bill.

72 I hereby certify that the foregoing is a full and true copy of an original order made and entered in the above-entitled action.

Attest my hand and the seal of the said circuit court this 18 day of October, A. D. 1875.

[SEAL.]

L. S. B. SAWYER, *Clerk*,
By J. F. O'BEIRNE,
Deputy Clerk.

On the 18th day of August, A. D. 1874, a demurrer to said bill was filed. Said demurrer is hereto annexed.

On the 5th day of October, A. D. 1874, an order of confession of said demurrer and granting leave to complainant to amend its said bill was entered herein, and is in the words and figures following, to wit:

At a stated term of the circuit court of the United States of America of the ninth judicial circuit, in and for the district of California, held at the court-room in the city of San Francisco on Monday, the 5th day of October, in the year of our Lord one thousand eight hundred
73 and seventy-four.

Present, the honorable Lorenzo Sawyer, judge.

Order confess'g dem'r to orig. bill.

THE GIANT POWDER COMPANY
vs.
THE CALIFORNIA POWDER WORKS ET AL.

On motion of M. A. Wheaton, esq., solicitor for complainant, it is ordered that the demurrer of the defendants herein, heretofore argued and submitted, be, and the same hereby is, confessed, and that leave be granted to complainant to amend its bill within thirty days.

I hereby certify that the foregoing is a full and true copy of an original order made and entered in the above-entitled action.

Attest my hand and the seal of said circuit court this 18th day of October, A. D. 1875.

[SEAL.]

L. S. B. SAWYER, *Clerk*,
By J. F. O'BEIRNE,
Deputy Clerk.

Present, honorable Stephen J. Field, associate justice of the U. S. Supreme Court; honorable Lorenzo Sawyer, circuit judge.

THE GIANT POWDER COMPANY
vs.
THE CALIFORNIA POWDER WORKS ET AL. } In equity. No. 1233.

Final decree.

The court having, on the 22d day of September, A. D. 1875, being a day in the July term, A. D. 1875, of said court, sustained the demurrer of the defendants to the complainant's amended bill of complain*ant* here-
80 in, with leave to complainant to amend its said bill on or before the next succeeding rule-day, and the said time granted complainant within which to amend its said bill having expired, and the default of said complainant to amend its said bill having been duly entered, and the court having on the 6th day of October, of the said term and year, on motion of C. R. Greathouse, esq., solicitor for the defendants—M. A. Wheaton, esq., solicitor for complainant, being present in open court and declining to amend its said bill of complaint, he having elected to abide by his said bill of complaint as filed in this cause—ordered, that a decree be entered herein dismissing said bill.

Thereupon, upon consideration thereof, it is ordered, adjudged, and decreed that the complainant's said bill be, and the same hereby is, dismissed, and that the said complainant pay the said defendants their costs in this behalf expended.

October 11th, 1875.

(Signed) LORENZO SAWYER,
U. S. Circuit Judge, Ninth Circuit.

(Endorsed:) Filed and entered Oct. 18, 1875. L. S. B. Sawyer, clerk, by J. F. O'Beirne, deputy clerk.

81 Whereupon the said pleadings, orders, and final decree are hereto annexed, said decree being duly signed, filed, and enrolled, pursuant to the practice of said circuit court.

Attest, &c.

[SEAL.] L. S. B. SAWYER, *Clerk*,
By J. F. O'BEIRNE,
Deputy Clerk.

(Endorsed:) Enrollment. Filed 18th October, 1875. L. S. B. Sawyer, clerk, by J. F. O'Beirne, deputy clerk.

82 *Order to show cause why order should not be made that complainant file copies of letters patent.*

In the circuit court of the United States in and for the district of California, ninth circuit.

THE GIANT POWDER COMPANY, PLAINTIFF,
vs.
THE CALIFORNIA POWDER WORKS ET AL.,
defendants.

On motion of the solicitors for defendants, it is ordered that the plaintiffs in the above-entitled suit show cause before the court, on the third

day of August, 1874, at the opening of court on said day, or as soon thereafter as counsel can be heard, why an order should not be made requiring the said plaintiffs to file as part of their bill of complaint copies of the several letters patent mentioned in said bill, and of which *protest* is therein made.

And it is further ordered that defendants have five days after the filing of said copies, or the refusal of the court to order the filing thereof, in which to demur, plead, or answer.

And it is further ordered that a copy of this order be forthwith
83 served on the solicitors for the plaintiffs.

July 31, 1874.

(Signed) LORENZO SAWYER,
Circuit Judge.

(Endorsed:)

Service of a copy of the within order is hereby admitted this 31st day of July, 1874.

WHEATON,
RIX,
Att'ys for Plaintiff.

Filed Aug. 1st, 1874.

L. S. B. SAWYER, *Clerk*,
By J. F. O'BEIRNE,
Deputy Clerk.

84 *Letters patent No. 50617, to Alfred Nobel.*

No. 50617.

The United States of America to all to whom these letters patent shall come:

Whereas, Alfred Nobel, of Hamburg, has alleged that he has invented a new and useful improved substitute for gunpowder, which he states has not been known or used before his application, has made oath that he is a citizen of Hamburg, that he does verily believe that he is the original and first inventor or discoverer of the said invention, and that the same hath not, to the best of his knowledge and belief, been previously known or used; has paid into the Treasury of the United States the sum of thirty-five dollars, and presented a petition to the Commissioner of Patents, signifying a desire of obtaining an exclusive property in the said invention, and praying that a patent may be granted for that purpose:

These are therefore to grant, according to law, to the said Alfred Nobel, his heirs, administrators, or assigns, for the term of seventeen years, from the twenty-fourth day of October, one thousand eight hundred and sixty-five, the full and exclusive right and liberty of
85 making, constructing, using, and vending to others to be used, the said invention, a description whereof is given in the words of the said Alfred Nobel in the schedule hereunto annexed, and is made a part of these presents.

In testimony whereof I have caused these letters to be made patent, and the seal of the Patent Office has been hereunto affixed.

Given under my hand, at the city of Washington, this twenty-fourth day of October, in the year of our Lord one thousand eight hundred and

sixty-five, and of the Independence of the United States of America the ninetieth.

[SEAL.]

W. T. OTTO,
Acting Secretary of the Interior.

Countersigned and sealed with the seal of the Patent Office.

T. C. THEAKER,
Commissioner of Patents.

86 The schedule referred to in these letters patent, and making part of the same.

To all whom it may concern:

Be it known that I, Alfred Nobel, of the city of Hamburg, have invented the use of nitro-glycerine, or analogous substances, as a substitute for gunpowder, and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing and to the letters of reference marked thereon. My invention consists in the use as a substitute for gunpowder of nitro-glycerine or its equivalent, substantially in the manner described hereafter, so that the said liquid, which, when exposed, cannot be wholly decomposed and exploded, shall by confinement be subjected to heat and pressure, by which its total and immediate decomposition and explosion is effected.

In order to enable others to make and use my invention, I will now proceed to describe the method of carrying it into effect.

On reference to the accompanying drawing which forms a part of this specification, fig. 1 is a view partly in section of one apparatus
87 by means of which I render nitro-glycerine, or its equivalent, available as a substitute for gunpowder, and fig. 2 a plan view.

There is a class of explosive substances comprising nitro-glycerine, the nitrates of ethel and methyl, and nitro-mannite, which have long been known, but have never been practically applied as explosive agents.

When a flame is applied to gunpowder or gun-cotton, the whole mass is instantaneously decomposed, this sudden decomposition taking place both when the substance is unconfined and when it is ignited under pressure.

On the application of heat or flame to nitro-glycerine, or other of the liquids above mentioned, when the latter is unconfined, only that portion of the liquid is decomposed which is directly acted on by the heat or flame, so that it is practically impossible to instantaneously explode the entire mass; hence under ordinary circumstances such substances cannot be looked upon as explosive agents.

I have found, however, that when glycerine, mannite, or other of the materials mentioned is confined, and a portion of the same is heated to decomposition, the gases evolved are at such an intense heat, and
88 subject the material to such an excessive pressure, that the whole mass is decomposed almost instantaneously. The chief point of my invention consists in overcoming the difficulty of suddenly igniting the entire mass of the materials mentioned, so that the same can be practically used as explosive agents.

The nitro-glycerine is first prepared by adding glycerine to a mixture of sulphuric and nitric acids, the addition not being made drop by drop, as in the usual manner, but the glycerine and acids being poured together into a funnel, and being discharged from the same into a body

of cold water, the nitro-glycerine, being insoluble, quickly separating from the water, which is maintained at a low temperature by any suitable means.

When nitric acid of a high specific gravity is used, the temperature is much increased by reaction. It is, therefore, better to introduce the nitric acid and glycerine gradually into the sulphuric acid, allowing the mixture to cool between each operation.

If the material is to be used for blasting, it may be poured directly into the opening drilled in the rock, the opening above the liquid being closed in any suitable manner; for other purposes, however, 89 the material can be best used when confined in cases.

The material, when thus confined, may be exploded—

Firstly. By exploding a quantity of gunpowder, or other substances, in contact with the liquid (the powder being confined in a water-proof tube or case); the heated gases evolved from the powder, being distributed throughout the mass of the liquid, raise the temperature of the latter sufficiently to decompose the same. When powder is used for this purpose, the case containing it may be immersed in the liquid, the powder being ignited by means of a fuse, or by an electric spark. If desirable, however, the liquid may be placed in a tube and inserted in a mass of powder, which is then ignited in any suitable manner.

Secondly. By an electric spark, or by passing a powerful current of electricity through a fine wire immersed in the liquid. An apparatus for thus effecting the explosion of the fluid is shown in the accompanying drawing; A being the case containing the fluid; B B, two wires which pass through glass tubes *a a*, or through other insulating 90 substance, into the interior of the case; and *c* a fine platina wire, which connects the ends of the wires B B together within the case.

The platina wire is heated by an electric current, the material in contact with the wire being thus decomposed, and the remaining portion subjected to the heat and pressure necessary to instantaneously decompose the whole mass, as already described.

Thirdly. By inserting in the liquid a thin case, containing lime and water, or any substances which, in combining, evolve heat.

Fourthly. By a fuse. This will do in a closed space, and under sufficient pressure, but if the gases of the decomposed liquid are enabled to escape before they accumulate to such pressure as to effect the requisite impulses of explosion, the liquid is decomposed but slowly, and the fire expires before the whole mass is consumed.

I claim as my invention, and desire to secure by letters patent, the use of nitro-glycerine, or its equivalent, substantially in the manner and for the purpose described.

ALFRED NOBEL.

FR. P. V. OHME,
AD. RITTER.
Witnesses.

91

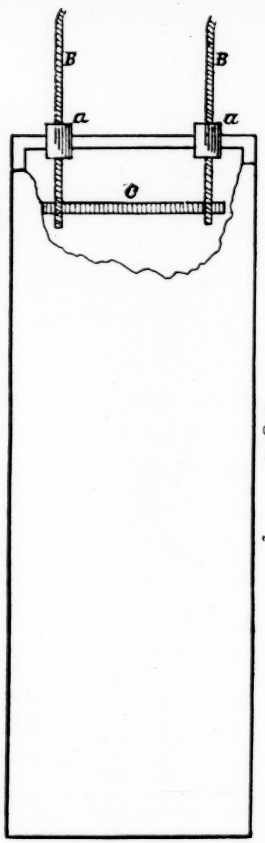


Fig. 1.

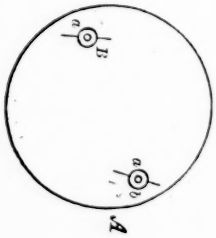


Fig. 2.

(Endorsed:) Filed August 14th, A. D. 1874. L. S. B. Sawyer, clerk. By J. F. O'Beirne, deputy clerk.

92 *Reissued letters patent, No. 78317, to Julius Bandman.*

No. 87317.

The United States of America. To all to whom these letters-patent shall come:

Whereas, Alfred Nobel, of Hamburg, Germany, has alleged that he has invented a new and useful improved explosive compound (he having assigned his right, title, and interest in said invention to Julius Bandman, of San Francisco, California), and has made oath that he is the original and first inventor or discoverer of the said invention, and that the same hath not to his knowledge and belief been previously known

or used, has paid into the Treasury of the United States the sum of thirty-five dollars, and presented a petition to the Commissioner of Patents, praying that a patent may be issued therefor:

These are therefore to grant to the said Julius Bandman, his executors, administrators, or assigns, for the term of seventeen years from the twenty-sixth day of May, one thousand eight hundred and sixty-eight, the full exclusive right and liberty of making, using, and vending to others to be used, the said invention, a description whereof is
93 given in the annexed schedule and made a part of these presents.

In testimony whereof I have caused these letters to be made patent, and the seal of the Patent-Office to be hereunto affixed.

Given under my hand at the city of Washington, this twenty-sixth day of May, in the year of our Lord one thousand eight hundred and sixty-eight, and of the Independence of the United States of America the ninety-second.

[SEAL.]

W. T. OTTO,
Acting Secretary of the Interior.
A. M. STOUT,
Acting Commissioner of Patents.

94 *Reissued letters patent, No. 78317, to Julius Bandman.*

Letters patent No. 78317. Dated May 26th, 1868.

IMPROVED EXPLOSIVE COMPOUND.

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that I, Alfred Nobel, of the city of Hamburg, Germany, have invented a new and useful composition of matter, to wit, an explosive powder.

The nature of the invention consists in forming out of two ingredients long known, viz, the explosive substance nitro-glycerine and an inexplosive porous substance hereafter specified, a composition which, without losing the great explosive power of nitro-glycerine, is very much altered as to its explosive and other properties, being far more safe and convenient for transportation, storage, and use, than nitro-glycerine.

In general terms, my invention consists in mixing with nitro-glycerine a substance which possesses a very great absorbent capacity and which at the same time is free from any quality which will decompose, destroy, or injure the nitro-glycerine, or its explosiveness.

95 It is undoubtedly true, as a general rule, that nitro-glycerine when mixed with another substance possesses less concentration of power than when used alone, but while the safety of the miner (to prevent leakage into seams in the rock) prohibits the use of nitro glycerine without cartridges, which latter must of course be somewhat less in diameter than the bore-holes which are to contain them, the powder herein described can be made to form a semi-pasty mass which yields to the slightest pressure and thus can be made to fill up the bore-holes entirely; practically therefore the miner will have as much nitro-glycerine in the same height of bore-hole with this powder as with nitro-glycerine in its pure state.

This is the real character and purpose of my invention, and in order

102 *Reissued letters patent, No. 3377, to U. S. Blasting Oil Co.*

THE U. S. [Vignétte.] PATENT OFFICE.

To all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of reissue patent No. 3377, granted April 13th, 1869, to the United States Blasting Oil Co.

In testimony whereof, I, S. S. Fisher, Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this fourth day of February, in the year of our Lord one thousand eight hundred and seventy and of the Independence of the United States the ninety-fourth.

[SEAL.]

SAM'L S. FISHER,
Commissioner.

103 No. 3377.] [Vignette.] [Reissue

The United States of America, to all to whom these letters patent shall come:

Whereas, the United States Blasting Oil Company, of New York, New York, assignees of Alfred Nobel, have alleged that said Alfred Nobel invented a new and useful improved mode of exploding nitro-glycerine, (for which letters patent were issued to him, dated October 24, 1865, which letters having been surrendered by said assignees, the same have been cancelled, and new letters ordered to issue to them on four separate amended specifications,) and had made oath that he was a citizen of the Free City of Hamburg, in Germany, that he did verily believe he was the original and first inventor or discoverer of the said invention, and that the same hath not to his knowledge and belief been previously known or used; said assignees having paid into the Treasury of the United
104 States the sum of thirty dollars, and presented a petition to the Commissioner of Patents, praying that a patent may be issued therefor.

These are therefore to grant to the said The United States Blasting Oil Company, their successors, or assigns, for the term of seventeen years from the twenty-fourth day of October, one thousand eight hunded and sixty-five, the full and exclusive right and liberty of making, using, and vending to others to be used, the said invention, a description whereof is given in the annexed schedule, and made a part of these presents.

In testimony whereof I have caused these letters to be made patent and the seal of the Patent Office to be hereunto affixed.

Given under my hand at the city of Washington, this thirteenth day of April, in the year of our Lord one thousand eight hundred and sixty-nine, and of the Independence of the United States of America the ninety-third.

[L. S.]

W. T. OTTO,
Acting Secretary of the Interior.
ELISHA FOOTE,
Commissioner of Patents.

Countersigned and sealed with the seal of the Patent Office.

(Here follows 2 diagrams marked pages 105 & 106.)

102 *Reissued letters patent, No. 3377, to U. S. Blasting Oil Co.*

THE U. S. [Vignétte.] PATENT OFFICE.

To all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of reissue patent No. 3377, granted April 13th, 1869, to the United States Blasting Oil Co.

In testimony whereof, I, S. S. Fisher, Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this fourth day of February, in the year of our Lord one thousand eight hundred and seventy and of the Independence of the United States the ninety-fourth.

[SEAL.] SAM'L S. FISHER,
Commissioner.

103 No. 3377.] [Vignette.] [Reissue

The United States of America, to all to whom these letters patent shall come:

Whereas, the United States Blasting Oil Company, of New York, New York, assignees of Alfred Nobel, have alleged that said Alfred Nobel invented a new and useful improved mode of exploding nitro-glycerine, (for which letters patent were issued to him, dated October 24, 1865, which letters having been surrendered by said assignees, the same have been cancelled, and new letters ordered to issue to them on four separate amended specifications,) and had made oath that he was a citizen of the Free City of Hamburg, in Germany, that he did verily believe he was the original and first inventor or discoverer of the said invention, and that the same hath not to his knowledge and belief been previously known or used; said assignees having paid into the Treasury of the United
104 States the sum of thirty dollars, and presented a petition to the Commissioner of Patents, praying that a patent may be issued therefor.

These are therefore to grant to the said The United States Blasting Oil Company, their successors, or assigns, for the term of seventeen years from the twenty-fourth day of October, one thousand eight hunded and sixty-five, the full and exclusive right and liberty of making, using, and vending to others to be used, the said invention, a description whereof is given in the annexed schedule, and made a part of these presents.

In testimony whereof I have caused these letters to be made patent and the seal of the Patent Office to be hereunto affixed.

Given under my hand at the city of Washington, this thirteenth day of April, in the year of our Lord one thousand eight hundred and sixty-nine, and of the Independence of the United States of America the ninety-third.

[L. S.] W. T. OTTO,
Acting Secretary of the Interior.
ELISHA FOOTE,
Commissioner of Patents.

Countersigned and sealed with the seal of the Patent Office.

(Here follows 2 diagrams marked pages 105 & 106.)

107 UNITED STATES PATENT OFFICE.

The United States Blasting Oil Company of New York, N. Y., assignees of Alfred Nobel. Letters patent No. 50,617, dated October 24, 1865; reissue No. 3,377, dated April 13, 1869. Division A. Improved mode of exploding nitro-glycerine.

The schedule refered to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that Alfred Nobel, of the city of Hamburg, Germany, has discovered or invented a new and useful improvement in the sciences and arts pertaining to the use and manufacture of nitro-glycerine. This specification having special reference to improved mode of exploding nitro-glycerine.

The said Nobel does not claim to have discovered or invented nitro-glycerine, as that was due to Sobrero. After the simple
108 discovery and chemical analysis that glycerine was capable of giving, when mixed with nitric and sulphuric acids, a substance analogous to gun-cotton, Sobrero abandoned further research with the declared opinion that its combustion or explosion could not be managed. In this condition the discovery or invention remained utterly useless to men of science and to artisans, until the discoveries and inventions of Nobel brought it into practical service in the useful arts. He discovered,

First. That in order to explode the whole, or even a large proportion of a mass of nitro-glycerine, it was necessary to subject it to confinement or restraint, and that when so confined it could be exploded in any desired quantity, by the application of heat and pressure, or of either of those agencies.

Second. That it could be used for practical blasting, and disrupting material substances generally.

And the said Noble invented—

First. A method of manufacturing nitro-glycerine in any desired quantity, and with greater economy than hitherto known.

Second. The appliances or contrivances necessary to successfully explode nitro-glycerine, in any desired quantity under the management of miners, or men of practical intelligence.

109 We now proceed to make a clear and concise description of the said discoveries and inventions of the said Nobel, in order to enable others skilled in the sciences and arts to which they belong to make use of and understand the same.

First. That nitro-glycerine, when under conditions of confinement, can be exploded in any desired quantity.

There is a class of explosive substances comprising nitro-glycerine, the nitrates of ethel and methyl, and nitro-mannite, which have long been known, but have never been practically applied as explosive agents. When 578° Fahrenheit of heat is applied to granulated gunpowder, the whole mass is exploded. Gun-cotton will explode in proportion to the degree of confinement, igniting at 266° Fahrenheit. Fulminates, ordinarily used in percussion-caps, will explode when subjected to 340° Fahrenheit. Nitro-glycerine will explode at 360° Fahrenheit. The decomposition of the above and other analogous substances, however, takes place at a much lower temperature, when subjected to pressure.

Gunpowder will explode to a certain extent, when not confined, but

on the application of heat or flame to nitro-glycerine, or other of
110 the liquids above mentioned when unconfined, only that portion of the liquid is decomposed which is acted on directly by the heat or flame, so that it is practically impossible instantaneously to explode the entire mass.

Nobel discovered that when nitro-glycerine, mannite, or other of the materials mentioned, is confined, and a portion of the same is heated to decomposition, the gases evolved are at such an intense heat, and subject the material to such an excessive pressure, that the whole mass is decomposed almost instantaneously.

The degree of confinement must be sufficient to allow a pressure upon the nitro-glycerine to an extent that 360° Fahrenheit will be realized, or to hold it in the presence of a percussion-cap, or other highly explosive agent, so that decomposition will take place before the liquid can escape the force or heat of the evolved gases of the said cap, &c. In this manner and by other methods Nobel discovered or invented that nitro-glycerine could be exploded in any desired quantity.

Second. That nitro-glycerine could be used for practical blasting, and disruption of material substances generally.

Having discovered that nitro-glycerine could be exploded in any desired quantity at the will of the manipulator, Nobel then proceeded
111 to adapt it to the useful arts, such as blasting rock, earth, and material substances generally.

To effect this object, he invented the mode or method hereinafter described, in substance as follows:

Placing the nitro-glycerine in a drill-hole or canister, and then exploding in the midst of the said nitro-glycerine a charge of gunpowder, gun-cotton, or injecting an electric flame into the mass of nitro-glycerine, or the heating to red heat of a metallic wire placed within the nitro-glycerine, the necessary heat will be effective in the decomposition of an atom or more of the nitro-glycerine when confined, which will cause the explosion of the whole mass.

Third. He invented a method of manufacturing nitro-glycerine in any desired quantity, and with greater economy than hitherto realized.

Chemical works describe the mode of manufacturing to be drop by drop of the component parts necessary to compound nitro glycerine, which in practice has been found to be expensive. Nobel invented a process by which the parts could be more rapidly mixed. Nobel's improved mode of manufacturing nitro-glycerine consists in adding
112 the glycerine to a mixture of sulphuric and nitric acids by pouring them together into a funnel, and discharging the mixture or nitro-glycerine thus made from the funnel into a body of cold water, kept at a low temperature by any suitable means. The nitro-glycerine being insoluble in water, quickly separates, and is easily removed therefrom.

The apparatus employed by Nobel in the practical application of his mode of manufacturing nitro glycerine, is shown in the drawing accompanying this specification in plate 1, figure 1, which represents a funnel-shaped vessel made of stone, lead, or other suitable material.

A is the vessel; B, perforations through the vessel; C is a cover; and D and E are tubes connected with reservoir-tanks of sufficient elevation to allow the influence of gravitation and atmospheric pressure, to force the liquids contained to descend in such manner that they will mingle or mix before they reach the water in which the said vessel is placed. There may be perforated disks in the said funnel-shaped vessel, placed so that the liquids will have additional opportunity to mix before they reach the water.

The glycerine being thus mixed with the acids, nitro-glycerine
113 will be formed, which, when in the water, separates from the acids.

The glycerine should enter the vessel through the pipe D, and the acids, one part nitric acid, say 48° Baumé specific gravity, and two parts sulphuric acid, say 66° Baumé specific gravity, through the other pipe E.

When nitric acid of a high specific gravity, say 48° Baumé, is used, the temperature is much increased by the reaction. It is, therefore, better to introduce the nitric acid and glycerine gradually into the sulphuric acid, allowing the mixture to cool between each operation. By preference, he introduces the nitric acid and glycerine a few moments, and then, waiting a short time for the mixture to cool, repeats the operation.

Second, the appliances or contrivances necessary to successfully and practically explode or decompose nitro-glycerine in any desired quantity, under the management of miners, or men of practical intelligence.

The processes or contrivances invented by Nobel for exploding nitro-glycerine, &c., are of several kinds, all and each calculated to produce the required heat or percussion.

First, by an electric spark or current of electricity, illustrated and explained as follows:

114 Plate 2, figure 1, is a sectional view of the drill-hole, canister, or vessel, containing the nitro-glycerine, marked N G.

A A represent the walls or sides of the drill-hole or vessel.

B B are wires, leading from an electric battery.

e is a small platina wire.

a a are holes through the cover of the vessel, or may be considered through the tamping in the drill-hole.

When the wires B B are connected with an electric battery, or any known generator of electricity, the small platina wire *e* becomes heated to a red heat, being about 800° Fahrenheit, more or less, depending upon the strength of the electric current.

This mode of making a wire red hot is well known in the sciences to which it belongs, and we do not limit ourselves to any particular battery. This however may, represent a voltaic or magneto-battery, but the fire may be produced by a static machine, generating a flame, of high degree of heat, flashing from the ends of B B across at *e*. This wire or flame, passing through the nitro glycerine, produces a decomposition of the nitro-glycerine, and, the evolution of the gases being of a great degree of heat, the whole mass is instantaneously decomposed or exploded. Secondly, by exploding a quantity of gunpowder
115 or other substance in contact with the liquid, (the powder being confined in a water-proof tube or case,) the heated gases evolved from the powder being distributed throughout the mass of the liquid, raise the temperature of the latter sufficiently to decompose the same. When powder is used for this purpose, the case containing it may be immersed in the liquid, the powder being ignited by means of a fuse or by an electric spark.

If desirable, however, the liquid may be placed in a tube, and inserted in a mass of powder, which is then ignited in any suitable manner.

Figure 2 represents a drill-hole in rock or a cartridge.

A A the walls of the hole.

B B is a fuse, (commonly called a train or powder fuse.)

C C is a fusee, being a small wooden plug hollowed, or a tin tube with orifice at *a* in which is placed a cork, or stopper.

e is gunpowder gun-cotton, or other explosive substances.

NG is the nitro-glycerine.

WW is water.

The operation of exploding the nitro-glycerine with this arrangement will be as follows:

116 The fuse BB is ignited at *f*, and the fire is conducted to the gunpowder in the fusee CC, which then explodes, bursting the plug, tube, or vessel, or shooting the cork or stopper from the orifice, which allows the heat to enter into the nitro-glycerine. The gases thus evolved, either by heat or percussion, explode or decompose the nitro-glycerine instantaneously.

The water WW serves as a tamping and prevents the gunpowder from kicking or forcing the fusee from the nitro-glycerine, thus confining the gas evolved by the explosion of the gunpowder in the midst of the nitro-glycerine.

Figure 4 is an arrangement similar to fig. 2, the only difference being in tamping. In this figure the tamping is sand, or other material.

Figure 3 represents similar arrangements illustrated by figs. 2 and 4, except that the fuse BB has attached to it a percussion-cap, P, which, when exploded, evolves the required gases that produce the decomposition or explosion of the nitro-glycerine, in which it is immersed.

BB is the fuse. P percussion cap. NG nitro-glycerine. WW water tamping. AA walls of the drill-hole.

117 Thirdly, the nitro-glycerine placed in a drill-hole or canister, represented by figs. 1, 2, 3, or 4, may be exploded by a train fuse of fulminate powder, or composition; for example, the ordinary fulminate powder used in percussion-caps may be put in a tube or casing of fibre gutta-percha, and made to fire, explode, or spit into the nitro-glycerine.

This will do in a closed space and under sufficient pressure, but if the gases of the decomposed liquid are enabled to escape before they accumulate to such a pressure as to affect the requisite impulses of explosion, the liquid is decomposed but slowly, and the fire expires before the whole mass is consumed.

Fourthly, by inserting in the liquid a thin case containing lime and water, or any substance which, when combining, evolve heat.

Also, by the liberation of substances or matter, either with the nitro-glycerine, in the presence of the nitro-glycerine, or in the midst of nitro-glycerine, by which process, or processes, mixing, engaging, or forming gases may be evolved of sufficient heat to produce decomposition, or explosion of the nitro-glycerine.

118 Having thus fully described the discoveries and inventions of the said Alfred Nobel with sufficient clearness and distinctness to enable others skilled in the sciences and arts to which they belong to make and use the same—

What we claim as the discoveries or inventions of the said Nobel, and desire to secure by letters-patent, in the name of the United States Blasting Oil Company aforesaid, as the assignee of the said Nobel, is as follows:

Subjecting nitro-glycerine to the influence of confinement, combined with such degree of pressure, or heat and pressure, however produced, as to result in the decomposition and explosion of the nitro-glycerine, substantially as hereinbefore described.

TAL. P. SHAFFNER.
JAMES DEVEAN.

Witnesses:
CHAS. C. WILSON.
J. E. M. BOWEN.

(Endorsed:) Filed August 14th, A. D. 1874. L. S. B. Sawyer, clerk, by J. F. O'Beirne, deputy clerk.

119 *Re-issued letters patent No. 3378, to U. S. Blasting Oil Co.*

THE U. STATES [Vignette.] PATENT OFFICE.

To all persons to whom these presents shall come, greeting:

This is to certify, that the annexed is a true copy from the records of this office of the reissued letters patent granted The United States Blasting Oil Company, dated April 13th, 1869, No. 3378.

In testimony whereof I, Samuel S. Fisher, Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed, this fifth day of February, in the year of our Lord one thousand eight hundred and seventy, and of the Independence of the United States the ninety-fourth.

[SEAL.] SAML S. FISHER,
Commissioner.

120 No. 3378.] [Vignette.] [Reissue.

The United States of America to all to whom these letters patent shall come:

Whereas, the United States Blasting Oil Company, of New York, New York, assignees of Alfred Nobel, have alleged that said Alfred Nobel invented a new and useful improved device for exploding nitro-glycerine (for which letters patent were issued to him, dated October 24, 1865, which letters having been surrendered by said assignees, the same have been cancelled and new letters ordered to issue to them on four separate amended specifications), and had made oath that he was a citizen of the free city of Hamburg, in Germany, that he did verily believe he was the original and first inventor or discoverer of the said invention and that the same hath not to his knowledge and belief been previously known or used, said assignees having paid into the Treasury of the

121 United States the sum of thirty dollars, and presented a petition to the Commissioner of Patents, praying that a patent may be issued therefor:

These are therefore to grant to the said The United States Blasting Oil Company, their successors or assigns, for the term of seventeen years, from the twenty-fourth day of October, one thousand eight hundred and sixty-five, the full and exclusive right and liberty of making, using, and vending to others to be used, the said invention a description whereof is given in the annexed schedule, and made a part of these presents.

In testimony whereof, I have caused these letters to be made patent and the seal of the Patent Office to be hereunto affixed.

Given under my hand at the city of Washington, on this thirteenth day of April, in the year of our Lord one thousand eight hundred and sixty-nine, and of the Independence of the United States of America the ninety-third.

[L. S.] W. T. OTTO,
Acting Secretary of the Interior.
ELISHA FOOTE,
Commissioner of Patents.

Countersigned and sealed with the seal of the Patent Office.

(Here follow two diagrams marked pages 122 and 123).

21 UNITED STATES PATENT OFFICE.

The United States Blasting Oil Company of New York, N. Y., assignees of Alfred Nobel. Letters patent No. 50617, dated October 24, 1865, reissue No. 3378, dated April 13, 1869. Division B. Improved device for exploding nitro-glycerine.

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that Alfred Nobel, of the city of Hamburg, Germany, has discovered or invented a new and useful improvement in the sciences and arts pertaining to the use and manufacture of nitro-glycerine; this specification having special reference to improvement in devices for exploding nitro-glycerine.

125 The said Nobel does not claim to have discovered or invented nitro-glycerine, as that was due to Sobrero. After the simple discovery and chemical analysis that glycerine was capable of giving, when mixed with nitric and sulphuric acids, a substance analogous to gun-cotton, Sobrero abandoned further research with the declared opinion that its combustion or explosion could not be managed. In this condition the discovery or invention remained utterly useless to men of science and to artisans until the discoveries and inventions of Nobel brought it into practical service in the useful arts. He discovered—

First. That in order to explode the whole or even a large proportion of a mass of nitro-glycerine, it was necessary to subject it to confinement or restraint, and that when so confined it could be exploded in any desired quantity, by the application of heat and pressure, or of either of those agencies.

Second. That it could be used for practical blasting, and disrupting material substances generally.

And the said Nobel invented—

First. A method of manufacturing nitro-glycerine in any desired quantity, and with greater economy than hitherto known.

126 Second. The appliances or contrivances necessary to successfully explode nitro-glycerine in any desired quantity under the management of miners, or men of practical intelligence.

We now proceed to make a clear and concise description of the said discoveries and inventions of the said Nobel, in order to enable others skilled in the sciences and arts to which they belong to make use of and understand the same.

First. That nitro-glycerine, when under conditions of confinement, can be exploded in any desired quantity.

There is a class of explosive substances, comprising nitro-glycerine, the nitrates of ethel and methyl, and nitro-mannite, which have long been known, but have never been practically applied as explosive agents. When 578° Fahrenheit of heat is applied to granulated gunpowder, the whole mass is exploded. Gun-cotton will explode in proportion to the degree of confinement, igniting at 266° Fahrenheit. Fulminates, ordinarily used in percussion-caps, will explode when subjected to 340° Fahrenheit. Nitro-glycerine will explode at 360° Fahrenheit. The decomposition of the above and other analogous substances, however, takes place at a much lower temperature when subjected to pressure.

127 Gunpowder will explode, to a certain extent, when not confined, but on the application of heat or flame to nitro-glycerine,

or other of the liquids above mentioned, when unconfined, only that portion of the liquid is decomposed which is acted on directly by the heat or flame, so that it is practically impossible instantaneously to explode the entire mass. Nobel discovered that when nitro-glycerine, mannite, or other of the materials mentioned, is confined, and a portion of the same is heated to decomposition, the gases evolved are at such an intense heat, and subject the material to such an excessive pressure, that the whole mass is decomposed almost instantaneously.

The degree of confinement must be sufficient to allow a pressure upon the nitro-glycerine to an extent that 360° Fahrenheit will be realized, or to hold it in the presence of a percussion-cap, or other highly explosive agent, so that decomposition will take place before the liquid can escape the force or heat of the evolved gases of the said cap, &c. In this manner, and by other methods, Nobel discovered, or invented, that nitro-glycerine could be exploded in any desired quantity.

128 Second. That nitro-glycerine could be used for practical blasting and disruption of material substances generally.

Having discovered that nitro-glycerine could be exploded in any desired quantity at the will of the manipulator, Nobel then proceeded to adapt it to the useful arts, such as blasting rock, earth, and material substances generally.

To effect this object, he invented the mode or method hereinafter described, in substance, as follows:

Placing the nitro-glycerine in a drill-hole or canister and then exploding in the midst of the said nitro-glycerine a charge of gunpowder, gun-cotton, or injecting an electric flame into the mass of nitro-glycerine, or the heating to red-heat of a metallic wire placed within the nitro-glycerine, the necessary heat will be effective in the decomposition of an atom or more of the nitro-glycerine when confined, which will cause the explosion of the whole mass.

Third. He invented a method of manufacturing nitro-glycerine in any desired quantity and with greater economy than hitherto realized.

Chemical works describe the mode of manufacturing to be
129 drop by drop of the component parts necessary to compound nitro-glycerine, which, in practice, has been found to be expensive. Nobel invented a process by which the parts could be more rapidly mixed.

Nobel's improved mode of manufacturing nitro-glycerine consists in adding the glycerine to a mixture of sulphuric and nitric acids by pouring them together into a funnel and discharging the mixture or nitro-glycerine thus made from the funnel into a body of cold water, kept at a low temperature by any suitable means. The nitro-glycerine, being insoluble in water, quickly separates, and is easily removed therefrom.

The apparatus employed by Nobel in the practical application of his new mode of manufacturing nitro-glycerine is shown in the drawing accompanying this specification in plate 1, figure 1, which represents a funnel-shaped vessel made of stone, lead, or other suitable material.

A is the material; B, perforations through the vessel. C is a cover; and D and E are tubes connected with reservoir-tanks of sufficient elevation to allow the influence of gravitation and atmospheric pressure to force the liquids contained to descend in such manner that
130 they will mingle or mix before they reach the water in which the said vessel is placed. There may be perforated disks in the said funnel-shaped vessel, placed so that the liquids will have additional opportunity to mix before they reach the water.

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125 The said Nobel does not claim to have discovered or invented nitro-glycerine, as that was due to Sobrero. After the simple discovery and chemical analysis that glycerine was capable of giving, when mixed with nitric and sulphuric acids, a substance analogous to gun-cotton, Sobrero abandoned further research with the declared opinion that its combustion or explosion could not be managed. In this condition the discovery or invention remained utterly useless to men of science and to artisans until the discoveries and inventions of Nobel brought it into practical service in the useful arts. He discovered—

First. That in order to explode the whole or even a large proportion of a mass of nitro-glycerine, it was necessary to subject it to confinement or restraint, and that when so confined it could be exploded in any desired quantity, by the application of heat and pressure, or of either of those agencies.

Second. That it could be used for practical blasting, and disrupting material substances generally.

And the said Nobel invented—

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or other of the liquids above mentioned, when unconfined, only that portion of the liquid is decomposed which is acted on directly by the heat or flame, so that it is practically impossible instantaneously to explode the entire mass. Nobel discovered that when nitro glycerine, mannite, or other of the materials mentioned, is confined, and a portion of the same is heated to decomposition, the gases evolved are at such an intense heat, and subject the material to such an excessive pressure, that the whole mass is decomposed almost instantaneously.

The degree of confinement must be sufficient to allow a pressure upon the nitro-glycerine to an extent that 360° Fahrenheit will be realized, or to hold it in the presence of a percussion-cap, or other highly explosive agent, so that decomposition will take place before the liquid can escape the force or heat of the evolved gases of the said cap, &c. In this manner, and by other methods, Nobel discovered, or invented, that nitro-glycerine could be exploded in any desired quantity.

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Having discovered that nitro-glycerine could be exploded in any desired quantity at the will of the manipulator, Nobel then proceeded to adapt it to the useful arts, such as blasting rock, earth, and material substances generally.

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Placing the nitro-glycerine in a drill-hole or canister and then exploding in the midst of the said nitro-glycerine a charge of gunpowder, gun-cotton, or injecting an electric flame into the mass of nitro-glycerine, or the heating to red-heat of a metallic wire placed within the nitro-glycerine, the necessary heat will be effective in the decomposition of an atom or more of the nitro-glycerine when confined, which will cause the explosion of the whole mass.

Third. He invented a method of manufacturing nitro-glycerine in any desired quantity and with greater economy than hitherto realized.

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Nobel's improved mode of manufacturing nitro-glycerine consists in adding the glycerine to a mixture of sulphuric and nitric acids by pouring them together into a funnel and discharging the mixture or nitro-glycerine thus made from the funnel into a body of cold water, kept at a low temperature by any suitable means. The nitro-glycerine, being insoluble in water, quickly separates, and is easily removed therefrom.

The apparatus employed by Nobel in the practical application of his new mode of manufacturing nitro-glycerine is shown in the drawing accompanying this specification in plate 1, figure 1, which represents a funnel-shaped vessel made of stone, lead, or other suitable material.

A is the material; B, perforations through the vessel. C is a cover; and D and E are tubes connected with reservoir-tanks of sufficient elevation to allow the influence of gravitation and atmospheric pressure to force the liquids contained to descend in such manner that

130 they will mingle or mix before they reach the water in which the said vessel is placed. There may be perforated disks in the said funnel-shaped vessel, placed so that the liquids will have additional opportunity to mix before they reach the water.

The glycerine being thus mixed with the acids, nitro-glycerine will be formed, which, when in the water, separates from the acids.

The glycerine should enter the vessel through the pipe D, and the acids, one part nitric acid, say 48° Beaumé specific gravity, and two parts sulphuric acid, say 66° Baumé specific gravity, through the other pipe, E.

When nitric acid of a high specific gravity, say 48° Baumé, is used, the temperature is much increased by the reaction. It is, therefore, better to introduce the nitric acid and glycerine gradually into the sulphuric acid, allowing the mixture to cool between each operation. By preference, he introduces the nitric acid and glycerine a few moments, and then, waiting a short time for the mixture to cool, repeats the operation.

Second. The appliances or contrivances necessary to successfully
131 and practically explode or decompose nitro-glycerine in any desired quantity, under the management of miners or men of practical intelligence.

The processes or contrivances invented by Nobel for exploding nitro-glycerine, &c., are of several kinds, all and each calculated to produce the required heat or percussion.

First, by an electric spark, or current of electricity, illustrated and explained as follows:

Plate 2, figure 1, is a sectional view of the drill-hole, canister, or vessel containing the nitro-glycerine, marked N G.

A A represent the walls or sides of the drill-hole or vessel.

B B are wires leading from an electric battery.

c is a small platina wire.

a a are holes through the cover of the vessel, or may be considered through the tamping in the drill-hole.

When the wires B B are connected with an electric battery, or any known generator of electricity, the small platina wire *c* becomes heated to a red-heat, being about 800° Fahrenheit, more or less, depending upon the strength of the electric current.

This mode of making a wire red-hot is well known in the sciences
132 to which it belongs, and we do not limit ourselves to any particular battery. This, however, may represent a voltaic or magneto battery, but the fire may be produced by a static machine, generating a flame, of high degree of heat, flashing from the ends of B B across at *c*. This wire or flame, passing through the nitro-glycerine, produces a decomposition of the nitro-glycerine, and, the evolution of the gases being of a great degree of heat, the whole mass is instantaneously decomposed or exploded.

Secondly, by exploding a quantity of gunpowder or other substance in contact with the liquid (the powder being confined in a water-proof tube or case); the heated gases evolved from the powder being distributed throughout the mass of the liquid, raise the temperature of the latter sufficiently to decompose the same. When powder is used for this purpose, the case containing it may be immersed in the liquid, the powder being ignited by means of a fuse or by an electric spark.

If desirable, however, the liquid may be placed in a tube, and inserted in a mass of powder, which is then ignited in any suitable manner.

Figure 2 represents a drill-hole in rock or a cartridge.

133 A A the walls of the hole.

B B is a fuse (commonly called a train or powder fuse).

C C is a fusee, being a small wooden plug hollowed, or a tin tube with orifice at *a*, in which is placed a cork or stopper.

e is gunpowder, gun-cotton, or other explosive substances.
N G is the nitro-glycerine.
W W is water.

The operation of exploding the nitro-glycerine with this arrangement will be as follows:

The fuse, B B, is ignited at *f*, and the fire is conducted to the gunpowder in the fusee C C, which then explodes, bursting the plug, tube, or vessel, or shooting the cork or stopper from the orifice, which allows the heat to enter into the nitro-glycerine. The gases thus evolved, either by heat or percussion, explode or decompose the nitro-glycerine instantaneously.

The water, W W, serves as a tamping, and prevents the gunpowder from kicking or forcing the fusee from the nitro-glycerine, thus confining the gas evolved by the explosion of the gunpowder in the midst of the nitro-glycerine.

Figure 4 is an arrangement similar to Fig. 2, the only difference
134 being in tamping. In this figure the tamping is sand, or other material.

Figure 3 represents similar arrangements illustrated by Fig's 2 and 4, except that the fuse B B has attached to it a percussion-cap, P, which, when exploded, evolves the required gases that produce the decomposition or explosion of the nitro-glycerine in which it is immersed.

B B is the fuse; P, percussion-cap; N G, nitro glycerine; W W, water-tamping; A A, walls of the drill-hole.

Thirdly, the nitro-glycerine placed in a drill-hole or canister, represented by Fig's 1, 2, 3, or 4, may be exploded by a train-fuse of fulminate powder, or composition; for example, the ordinary fulminate powder used in percussion caps may be put in a tube or casing of fibre, gutta-percha, and made to fire, explode, or spit into the nitro-glycerine.

This will do in a closed space, and under sufficient pressure, but if the gases of the decomposed liquid are enabled to escape before they accumulate to such a pressure as to affect the requisite impulses of explosion, the liquid is decomposed but slowly, and the fire expires before the whole mass is consumed.

135 Fourthly, by inserting in the liquid a thin case containing lime and water, or any substance, which, when combining, evolve heat.

Also, by the liberation of substances or matter, either with the nitro-glycerine, in the presence of the nitro-glycerine, or in the midst of nitro-glycerine, by which process or processes, mixing, engaging, or forming gases may be evolved of sufficient heat to produce decomposition or explosion of the nitro-glycerine.

Having thus fully described the discoveries and inventions of the said Alfred Nobel, with sufficient clearness and distinctness to enable others skilled in the sciences and arts to which they belong to make and use the same,

What we claim as the discoveries or inventions of the said Nobel, and desire to secure by letters patent, in the name of the United States Blasting Oil Company, aforesaid, as the assignee of the said Nobel, is as follows:

1. The decomposition or explosion of nitro-glycerine when under confinement, as hereinbefore described, by means of heat generated within the mass of nitro-glycerine through the agency of an electric
136 spark, or of a voltaic, magnetic-electric, or static-electric current, however generated, substantially as and for the purposes hereinbefore set forth.

2. The decomposition or explosion of nitro-glycerine, when under restraint or confinement, as hereinbefore described, by the evolution or generation of heated gas or gases, and the consequent production of heat and pressure within or upon the fluid mass of nitro-glycerine, by means of the explosion of gunpowder or other equivalent explosive or fulminating substance under or upon the surface of the nitro-glycerine, substantially as and for the purposes hereinbefore set forth.

3. The use and application of the plug of wood, metal, or other suitable material for holding or containing gunpowder, or other explosive substance, within, upon, or near to the fluid mass of confined nitro-glycerine, together with the parts and arrangements of such plug in the manner and substantially as hereinbefore described.

4. The application and use of a percussion-cap, fitted to a train, or other fuse used for conducting fire, when used in connection with nitro-glycerine, so that the said cap, evolving on its explosion the re-
137 quired heated gases, or the forces of percussion or concussion, shall decompose or explode nitro-glycerine, when under confinement, in the manner and substantially as hereinbefore described.

5. The application and use, within the fluid mass of nitro-glycerine, subjected to confinement, as hereinbefore described, of lime and water, or other substances which will, on combining under similar circumstances, generate a sufficient degree of heat, for the purpose of decomposing or exploding nitro-glycerine by means of heat generated within it, substantially as hereinbefore described.

TAL. P. SHAFFNER.
JAMES DEVEAN.

Witnesses:
CHA'S C. WILSON.
J. E. M. BOWEN.

(Endorsed:) Filed August 14th, A. D. 1874. L. S. B. Sawyer, clerk, by J. F. O'Beirne, deputy clerk.

138 *Reissued letters patent No. 3379 to U. S. Blasting Oil Co.*

THE U. S. [vignette] PATENT OFFICE.

To all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the reissued letters patent granted the United States Blasting Oil Company, dated April 13th, 1869, No. 3379, "for impr'd mode of manufacturing nitro-glycerine."

In testimony whereof I, J. M. Thacher, acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this fifteenth day of December, in the year of our Lord one thousand eight hundred and seventy-three; and of the Independence of the United States the ninety-eighth.

[SEAL.]

J. M. THACHER,
Acting Commissioner.

139 No. 3379.] [Vignette.] [Reissued.

The United States of America to all to whom these letters patent shall come:

Whereas the United States Blasting Oil Company of New York, New York, assignees of Alfred Nobel, have alleged that said Alfred Nobel

invented a new and useful improved mode of manufacturing nitro-glycerine (for which letters patent were issued to him dated October 24, 1865, which letters having been surrendered by said assignees, the same have been cancelled, and new letters ordered to issue to them on four separate amended specifications), and had made oath that he was a citizen of the free city of Hamburg, in Germany; that he did verily believe he was the original and first inventor or discoverer of the said invention, and that the same hath not to his knowledge and belief been previously known or used, said assignees having paid into the Treasury of the United States the sum of thirty dollars, and presented a pe-
140 tition to the Commissioner of Patents praying that a patent may be issued therefor:

These are therefore to grant to the said The United States Blasting Oil Company, their successors or assigns, for the term of seventeen years from the twenty-fourth day of October, one thousand eight hundred and sixty-five, the full and exclusive right and liberty of making, using, and vending to others to be used, the said invention, a description whereof is given in the annexed schedule and made a part of these presents.

In testimony whereof I have caused these letters to be made patent and the seal of the Patent Office to be hereunto affixed.

Given under my hand at the city of Washington, this thirteenth day of April, in the year of our Lord one thousand eight hundred and sixty-nine, and of the Independence of the United States of America the ninety-third.

[L. S.]

W. T. OTTO,
Acting Secretary of the Interior.
ELISHA FOOTE,
Commissioner of Patents.

Countersigned and sealed with the seal of the Patent Office.

(Here follows two diagrams marked pages 141 and 142.)

143 UNITED STATES PATENT OFFICE.

The United States Blasting Oil Company of New York, N. Y., assignees of Alfred Nobel. Letters patent No. 50617, dated October 24, 1865, reissue No. 3379, dated April 13, 1869. Division C. Improved device for manufacturing nitro glycerine.

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that Alfred Nobel, of the city of Hamburg, Germany, has discovered or invented a new and useful improvement in the sciences and arts pertaining to the use and manufacture of nitro-glycerine; this specification having special reference to improvement in devices for manufacturing nitro-glycerine.

144 The said Nobel does not claim to have discovered or invented nitro-glycerine, as that was due to Sobrero. After the simple discovery and chemical analysis that glycerine was capable of giving, when mixed with nitric and sulphuric acids, a substance anal*a*gous to gun-cotton, Sobrero abandoned further research with the declared opinon that its combustion or explosion could not be managed. In this

Plate 2, figure 1, is a sectional view of the drill-hole, canister, or vessel containing the nitro-glycerine, marked N G.

A A represent the walls or sides of the drill-hole or vessel.

B B are wires leading from an electric battery.

e is a small platina wire.

a a are holes through the cover of the vessel, or may be considered through the tamping in the drill-hole.

When the wires B B are connected with an electric battery, or any known generator of electricity, the small platina wire *e* becomes heated to a red heat, being about 800° Fahrenheit, more or less, depending upon the strength of the electric current.

151 This mode of making a wire red hot is well known in the sciences to which it belongs, and we do not limit ourselves to any particular battery. This, however, may represent a voltaic or magneto battery, but the fire may be produced by a static machine, generating a flame, of high degree of heat, flashing from the ends of B B across at *e*. This wire or flame, passing through the nitro-glycerine, produces a decomposition of the nitro-glycerine, and, the evolution of the gases being of a great degree of heat, the whole mass is instantaneously decomposed or exploded. Secondly, by exploding a quantity of gunpowder or other substance in contact with the liquid (the powder being confined in a water-proof tube or case), the heated gases evolved from the powder being distributed throughout the mass of the liquid, raise the temperature of the latter sufficiently to decompose the same. When powder is used for this purpose, the case containing it may be immersed in the liquid, the powder being ignited by means of a fuse or by an electric spark.

152 If desirable, however, the liquid may be placed in a tube, and inserted in a mass of powder, which is then ignited in any suitable manner.

Figure 2 represents a drill-hole in rock or a cartridge.

A A, the walls of the hole.

B B is a fuse, commonly called a train or powder-fuse.

C C is a fusee, being a small wooden plug hollowed, or a tin tube with orifice at *a*, in which is placed a cock, or stopper.

e is gunpowder, gun-cotton, or other explosive substances.

N G is the nitro-glycerine.

W W is water.

The operation of exploding the nitro-glycerine with this arrangement will be as follows:

The fuse B B is ignited at *f*, and the fire is conducted to the gunpowder in the fusee C C, which then explodes, bursting the plug, tube, or vessel, or shooting the cork or stopper from the orifice, which allows the heat to enter into the nitro-glycerine. The gases thus evolved, either by heat or percussion, explode or decompose the nitro-glycerine instantaneously.

The water W W serves as a tamping, and prevents the gunpowder from kicking or forcing the fusee from the nitro-glycerine, thus confining the gas evolved by the explosion of the gunpowder in the midst of the nitro-glycerine.

153 Figure 4 is an arrangement similar to fig. 2, the only difference being in tamping. In this figure the tamping is sand, or other material.

Figure 3 represents similar arrangements illustrated by fig's 2 and 4, except that the fuse B B has attached to it a percussion-cap, P, which

when exploded evolves the required gases that produce the decomposition on explosion of the nitro-glycerine in which it is immersed.

B B is the fuse; P, percussion-cap; N G, nitro-glycerine; W W, water-tamping; A A, walls of the drill-hole.

Thirdly, the nitro-glycerine placed in a drill-hole or canister, represented by fig's 1, 2, 3, or 4, may be exploded by a train fuse of fulminate powder, or composition; for example, the ordinary fulminate powder used in percussion-caps may be put in a tube, or casing of fibre, gutta-percha, and made to fire, explode, or spit into the nitro-glycerine.

This will do in a closed space and under sufficient pressure, but if the gases of the decomposed liquid are enabled to escape before they accumulate to such a pressure as to affect the requisite impulses of
154 explosion, the liquid is decomposed but slowly and the fire expires before the whole mass is consumed.

Fourthly, by inserting in the liquid a thin case containing lime and water, or any substance which, when combining, evolve heat.

Also by the liberation of substances or matter, either with the nitro-glycerine, in the presence of the nitro-glycerine, or in the midst of nitro-glycerine, by which process, or processes, mixing, engaging, or forming gases may be evolved of sufficient heat to produce decomposition or explosion of the nitro-glycerine.

Having thus fully described the discoveries and inventions of the said Alfred Nobel, with sufficient clearness and distinctness to enable others skilled in the sciences and arts to which they belong to make and use the same—

What we claim as the discoveries or inventions of the said Nobel, and desire to secure by letters patent, in the name of the United States Blasting Oil Company, aforesaid, as the assignee of the said Noble, is as follows:

Making nitro glycerine (being a mixture of glycerine with nitric and sulphuric acids), by pouring together, into a funnel or other suita-
155 ble receptacle, separate streams of glycerine and of those acids, and discharging the mixture therefrom into a body of cold water, maintained at low temperature by any suitable means.

TAIL P. SHAFFNER.
JAMES DEVEAN.

Witnesses:
CHA'S C. WILSON.
J. E. M. BOWEN.

(Endorsed:) Filed August 14th, A. D. 1874. L. S. B. Sawyer, clerk, by J. F. O'Beirne, deputy clerk.

156 *Reissued letters pat nt. No. 3380, to U. S. Blasting Oil Co.*

THE U. S. [Vignette] PATENT OFFICE.

To all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy, from the records of this office, of reissue patent No. 3380, granted April 13th, 1869, to the United States Blasting Oil Company.

In testimony whereof I, S. S. Fisher, Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this fourth day of February, in the year of our Lord one thousand eight hundred and seventy, and of the Independence of the United States the ninety-fourth.

[SEAL.]

SAM'L S. FISHER,
Commissioner.

157 No. 3380.] [Vignette.] [Reissue.

The United States of America to all to whom these letters patent shall come:

Whereas the United States Blasting Oil Company, of New York, New York, assignees of Alfred Nobel, have alleged that said Alfred Nobel invented a new and useful improvement in the use of nitro-glycerine (for which letters patent were issued to him, dated October 24, 1865, which letters, having been surrendered by said assignees, the same have been cancelled, and new letters ordered to issue to them on four separate amended specifications), and had made oath that he was a citizen of the free city of Hamburg, in Germany; that he did verily believe he was the original and first inventor or discoverer of the said improvement, and that the same hath not to his knowledge and belief been previously known or used; said assignees having paid into the Treasury of the United States the sum of thirty dollars, and pre-
158 sented a petition to the Commissioner of Patents, praying that a patent may be issued therefor:

These are, therefore, to grant to the said the United States Blasting Oil Company, their successors or assigns, for the term of seventeen years from the twenty-fourth day of October, one thousand eight hundred and sixty-five, the full and exclusive right and liberty of making, using, and vending to others to be used, the said improvement, a description whereof is given in the annexed schedule and made a part of these presents.

In testimony whereof I have caused these letters to be made patent and the seal of the Patent Office to be hereunto affixed.

Given under my hand, at the city of Washington, this thirteenth day of April, in the year of our Lord one thousand eight hundred and sixty-nine, and of the Independence of the United States of America the ninety-third.

[L. S.]

W. T. OTTO,
Acting Secretary of the Interior.
ELISHA FOOTE,
Commissioner of Patents.

Countersigned and sealed with the seal of the Patent Office.

[Here follow two diagrams, marked pages 159 & 160.]

161 UNITED STATES PATENT OFFICE.

The United States Blasting Oil Company, of New York, N. Y., assignees of Alfred Nobel. Letters patent No. 50617, dated October 24, 1865; reissue No. 3380, dated April 13, 1869. Division D. Improvement in the use of nitro-glycerine.

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that Alfred Nobel, of the city of Hamburg, Germany, has discovered or invented a new and useful improvement in the sciences and arts pertaining to the use and manufacture of nitro-glycerine, this specification having special reference to improvement in the use of nitro-glycerine.

The said Nobel does not claim to have discovered or invented
162 nitro glycerine, as that was due to Sobrero. After the simple discovery and chemical analysis that glycerine was capable of giving, when mixed with nitric and sulphuric acids, a substance analogous to gun-cotton, Sobrero abandoned further research, with the declared opinion that its combustion or explosion could not be managed. In this condition the discovery or invention remained—utterly useless to men of science and to artisans—until the discoveries and inventions of Nobel brought it into practical service in the useful arts. He discovered—

First. That in order to explode the whole or even a large proportion of a mass of nitro-glycerine it was necessary to subject it to confinement or restraint, and that when so confined it could be exploded in any desired quantity by the application of heat and pressure, or of either of those agencies.

Second. That it could be used for practical blasting and disrupting material substances generally.

And the said Nobel invented—

First. A method of manufacturing nitro-glycerine in any desired quantity, and with greater economy than hitherto known.

Second. The appliances or contrivances necessary to successfully explode nitro-glycerine in any desired quantity, under the management of miners or men of practical intelligence.

163 We now proceed to make a clear and concise description of the said discoveries and inventions of the said Nobel, in order to enable others skilled in the sciences and arts to which they belong, to make use of and understand the same.

First. That nitro-glycerine, when under conditions of confinement, can be exploded in any desired quantity.

There is a class of explosive substances comprising nitro-glycerine, the nitrates of ethel and methyl, and nitro-mannite, which have long been known, but have never been practically applied as explosive agents. When 578° Fahrenheit of heat is applied to granulated gunpowder, the whole mass is exploded. Gun-cotton will explode in proportion to the degree of confinement, igniting at 266° Fahrenheit. Fulminates ordinarily used in percussion caps will explode when subjected to 340° Fahrenheit. Nitro-glycerine will explode at 360° Fahrenheit. The decomposition of the above and other analogous substances, however, takes place at a much lower temperature when subjected to pressure.

Gunpowder will explode to a certain extent, when not confined, but on the application of heat or flame to nitro-glycerine, or other of
164 the liquids above mentioned, when unconfined, only that portion of the liquid is decomposed which is acted on directly by the heat or flame, so that it is practically impossible instantaneously to explode the entire mass. Nobel discovered that when nitro-glycerine, mannite, or other of the materials mentioned is confined, and a portion of the same is heated to decomposition, the gases cooled are at such an intense heat and subject the materials to such an excessive pressure that the whole mass is decomposed almost instantaneously.

The degree of confinement must be sufficient to allow a pressure upon the nitro-glycerine to an extent that 360° Fahrenheit will be realized, or to hold it in the presence of a percussion-cap, or other highly explosive agent, so that decomposition will take place before the liquid can escape the force or heat of the evolved gases of the said cap, &c. In this

157 No. 3380.] [Vignette.] [Reissue.

The United States of America to all to whom these letters patent shall come:

Whereas the United States Blasting Oil Company, of New York, New York, assignees of Alfred Nobel, have alleged that said Alfred Nobel invented a new and useful improvement in the use of nitro-glycerine (for which letters patent were issued to him, dated October 24, 1865, which letters, having been surrendered by said assignees, the same have been cancelled, and new letters ordered to issue to them on four separate amended specifications), and had made oath that he was a citizen of the free city of Hamburg, in Germany; that he did verily believe he was the original and first inventor or discoverer of the said improvement, and that the same hath not to his knowledge and belief been previously known or used; said assignees having paid into the Treasury of the United States the sum of thirty dollars, and pre-
158 sented a petition to the Commissioner of Patents, praying that a patent may be issued therefor:

These are, therefore, to grant to the said the United States Blasting Oil Company, their successors or assigns, for the term of seventeen years from the twenty-fourth day of October, one thousand eight hundred and sixty-five, the full and exclusive right and liberty of making, using, and vending to others to be used, the said improvement, a description whereof is given in the annexed schedule and made a part of these presents.

In testimony whereof I have caused these letters to be made patent and the seal of the Patent Office to be hereunto affixed.

Given under my hand, at the city of Washington, this thirteenth day of April, in the year of our Lord one thousand eight hundred and sixty-nine, and of the Independence of the United States of America the ninety-third.

[L. S.]

W. T. OTTO,
Acting Secretary of the Interior.
ELISHA FOOTE,
Commissioner of Patents.

Countersigned and sealed with the seal of the Patent Office.

[Here follow two diagrams, marked pages 159 & 160.]

161 UNITED STATES PATENT OFFICE.

The United States Blasting Oil Company, of New York, N. Y., assignees of Alfred Nobel. Letters patent No. 50617, dated October 24, 1865; reissue No. 3380, dated April 13, 1869. Division D. Improvement in the use of nitro-glycerine.

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that Alfred Nobel, of the city of Hamburg, Germany, has discovered or invented a new and useful improvement in the sciences and arts pertaining to the use and manufacture of nitro-glycerine, this specification having special reference to improvement in the use of nitro-glycerine.

The said Nobel does not claim to have discovered or invented
162 nitro glycerine, as that was due to Sobrero. After the simple discovery and chemical analysis that glycerine was capable of giving, when mixed with nitric and sulphuric acids, a substance analogous to gun-cotton, Sobrero abandoned further research, with the declared opinion that its combustion or explosion could not be managed. In this condition the discovery or invention remained—utterly useless to men of science and to artisans—until the discoveries and inventions of Nobel brought it into practical service in the useful arts. He discovered—

First. That in order to explode the whole or even a large proportion of a mass of nitro-glycerine it was necessary to subject it to confinement or restraint, and that when so confined it could be exploded in any desired quantity by the application of heat and pressure, or of either of those agencies.

Second. That it could be used for practical blasting and disrupting material substances generally.

And the said Nobel invented—

First. A method of manufacturing nitro-glycerine in any desired quantity, and with greater economy than hitherto known.

Second. The appliances or contrivances necessary to successfully explode nitro glycerine in any desired quantity, under the management of miners or men of practical intelligence.

163 We now proceed to make a clear and concise description of the said discoveries and inventions of the said Nobel, in order to enable others skilled in the sciences and arts to which they belong, to make use of and understand the same.

First. That nitro-glycerine, when under conditions of confinement, can be exploded in any desired quantity.

There is a class of explosive substances comprising nitro-glycerine, the nitrates of ethel and methyl, and nitro-mannite, which have long been known, but have never been practically applied as explosive agents. When 578° Fahrenheit of heat is applied to granulated gunpowder, the whole mass is exploded. Gun-cotton will explode in proportion to the degree of confinement, igniting at 266° Fahrenheit. Fulminates ordinarily used in percussion caps will explode when subjected to 340° Fahrenheit. Nitro-glycerine will explode at 360° Fahrenheit. The decomposition of the above and other analogous substances, however, takes place at a much lower temperature when subjected to pressure.

Gunpowder will explode to a certain extent, when not confined, but on the application of heat or flame to nitro-glycerine, or other of
164 the liquids above mentioned, when unconfined, only that portion of the liquid is decomposed which is acted on directly by the heat or flame, so that it is practically impossible instantaneously to explode the entire mass. Nobel discovered that when nitro-glycerine, mannite, or other of the materials mentioned is confined, and a portion of the same is heated to decomposition, the gases cooled are at such an intense heat and subject the materials to such an excessive pressure that the whole mass is decomposed almost instantaneously.

The degree of confinement must be sufficient to allow a pressure upon the nitro-glycerine to an extent that 360° Fahrenheit will be realized, or to hold it in the presence of a percussion-cap, or other highly explosive agent, so that decomposition will take place before the liquid can escape the force or heat of the evolved gases of the said cap, &c. In this

manner and by other methods Nobel discovered or invented that nitro-glycerine could be exploded in any desired quantity.

Second. That nitro-glycerine could be used for practical blasting, and disruption of material substances generally.

Having discovered that nitro-glycerine could be exploded in any desired quantity at the will of the manipulator, Nobel then proceeded to adapt it to the useful arts, such as blasting rocks, earth, and material substances generally.

To effect this object he invented the mode or method hereinafter described, in substance as follows:

Placing the nitro-glycerine in a drill-hole or canister, and then exploding in the midst of the said nitro-glycerine a charge of gunpowder, gun-cotton, or injecting an electric flame into the mass of nitro-glycerine, or the heating to red heat of a metallic wire placed within the nitro-glycerine, the necessary heat will be effective in the decomposition of an atom or more of the nitro-glycerine when confined, which will cause the explosion of the whole mass.

Third. He invented a method of manufacturing nitro-glycerine in any desired quantity, and with greater economy than hitherto realized.

Chemical works describe the mode of manufacturing to be drop by drop of the component parts necessary to compound nitro-glycerine, which in practice has been found to be expensive. Nobel invented a process by which the parts could be more rapidly mixed.

Nobel's improved mode of manufacturing nitro-glycerine consists in adding the glycerine to a mixture of sulphuric and nitric acids by pouring them together into a funnel, and discharging the mixture or nitro-glycerine thus made from the funnel into a body of cold water, kept at a low temperature by any suitable means. The nitro-glycerine, being insoluble in water, quickly separates and is easily removed therefrom.

The apparatus employed by Nobel in the practical application of his new mode of manufacturing nitro-glycerine is shown in the drawing accompanying this specification on plate 1, figure 1, which represents a funnel-shaped vessel made of stone, lead, or other suitable material.

A is the vessel; B, perforations through the vessel; C is a cover, and D and E are tubes connected with reservoir-tanks of sufficient elevation to allow the influence of gravitation and atmospheric pressure, to force the liquids contained to descend in such manner that they will mingle or mix before they reach the water in which the said vessel is placed. There may be perforated disks in the said funnel-shaped vessel, placed so that the liquids will have additional opportunity to mix before they reach the water.

The glycerine being thus mixed with the acids, nitro-glycerine will be formed, which, when in the water, separates from the acids.

The glycerine should enter the vessel through the pipe D, and the acids, one part nitric acid, say 48° Baume specific gravity, and two parts sulphuric acid, say 66° Baume specific gravity, through the other pipe E. When nitric acid of a high specific gravity, say 48° Baume, is used, the temperature is much increased by the reaction. It is, therefore, better to introduce the nitric acid and glycerine gradually into the sulphuric acid, allowing the mixture to cool between each operation. By preference, he introduces the nitric acid and glycerine a few moments, and then waiting a short time for the mixture to cool, repeats the operation.

Second. The appliances or contrivances necessary to successfully and practically explode or decompose nitro-glycerine in any desired quantity, under the management of miners, or men of practical intelligence.

The processes or contrivances invented by Nobel for exploding nitro-glycerine, &c., are of several kinds, all and each calculated to produce the required heat or percussion.

First. By an electric spark or current of electricity, illustrated and explained as follows:

168 Plate 2, figure 1, is a sectional view of the drill-hole, canister or vessel containing the nitro-glycerine, marked N G.

A A represent the walls or sides of the drill-hole or vessel.

B B are wires leading from an electric battery.

c is a small platina wire.

a a are holes through the cover of the vessel, or may be considered through the tamping in the drill-hole.

When the wires B B are connected with an electric battery, or any known generator of electricity, the small platina wire *c* becomes heated to a red heat, being about 800° Fahrenheit, more or less, depending upon the strength of the electric current.

This mode of making a wire red hot is well known in the sciences to which it belongs, and we do not limit ourselves to any particular battery. This, however, may represent a voltaic or magneto battery, but the fire may be produced by a static machine generating a flame of high degree of heat, flashing from the ends of B B across at *c*. This wire or flame, passing through the nitro-glycerine, produces a decomposition of the nitro-glycerine, and the evolution of the gases being of a great degree of heat, the whole mass is instantaneously decomposed or exploded.

169 Secondly. By exploding a quantity of gunpowder or other substance in contact with the liquid (the powder being confined in a water-proof tube or case), the heated gases evolved from the powder being distributed throughout the mass of the liquid, raise the temperature of the latter sufficiently to decompose the same. When powder is used for this purpose the case containing it may be immersed in the liquid, the powder being ignited by means of a fuse or by an electric spark.

If desirable, however, the liquid may be placed in a tube, and inserted in a mass of powder, which is then ignited in any suitable manner.

Figure 2 represents a drill-hole in rock or a cartridge.

A A, the walls of the hole.

B B is a fuse (commonly called a train or powder fuse).

C C is a fusee, being a small wooden plug hollowed, or a tin tube with orifice at *a*, in which is placed a cork or stopper.

c is gunpowder, gun-cotton, or other explosive substances.

N G is the nitro-glycerine.

W W is water.

The operation of exploding the nitro-glycerine with this arrangement will be as follows:

170 The fuse B B is ignited at *f*, and the fire is conducted to the gunpowder in the fusee C C, which then explodes, bursting the plug, tube, or vessel, or shooting the cork or stopper from the orifice, which allows the heat to enter into the nitro-glycerine. The gases thus evolved, either by heat or percussion, explode or decompose the nitro-glycerine instantaneously.

The water W W serves as a tamping, and prevents the gunpowder

from kicking or forcing the fusee from the nitro-glycerine, thus confining the gas evolved by the explosion of the gunpowder in the midst of the nitro-glycerine.

Figure 4 is an arrangement similar to Fig. 2, the only difference being in tamping. In this figure the tamping is sand, or other material.

Figure 3 represents similar arrangements illustrated by Fig's 2 and 4, except that the fuse B B has attached to it a percussion cap, P, which, when exploded, evolves the required gases that produce the decomposition or explosion of the nitro-glycerine in which it is immersed.

B B is the fuse. P, percussion-cap. N G, nitro-glycerine. W W, water tamping. A A, walls of the drill-hole.

Thirdly. The nitro-glycerine placed in a drill-hole or canister,
171 represented by Fig's 1, 2, 3, or 4, may be exploded by a train fuse of fulminate powder, or composition; for example, the ordinary fulminate powder used in percussion caps may be put in a tube, or casing of fibre, gutta-percha, and made to fire, explode, or spit into the nitro-glycerine.

This will do in a closed space and under sufficient pressure, but if the gases of the decomposed liquid are enabled to escape before they accumulate to such a pressure as to affect the requisite impulses of explosion, the liquid is decomposed but slowly, and the fire expires before the whole mass is consumed.

Fourthly. By inserting in the liquid a thin case containing lime and water, or any substance which, when combining, evolve heat.

Also, by the liberation of substances or matter, either with the nitro-glycerine, in the presence of the nitro-glycerine, or in the midst of nitro-glycerine, by which process or processes, mixing, engaging, or forming gases may be evolved of sufficient heat to produce decomposition or explosion of the nitro-glycerine.

Having thus fully described the discoveries and inventions of
172 the said Alfred Nobel, with sufficient clearness and distinctness to enable others skilled in the sciences and arts to which they belong to make and use the same,

What we claim as the discoveries or inventions of the said Nobel, and desire to secure by letters patent, in the name of the United States Blasting Oil Company, aforesaid, as the assignee of the said Nobel, is as follows:

The application and use of nitro-glycerine, simple or compounded, as an explosive for blasting, or for disrupting purposes, in the manner and substantially as hereinbefore described.

TOL. P. SHAFFNER.
JAMES DEVEAU.

Witnesses:
CHA'S C. WILSON.
J. E. M. BOWEN.

(Endorsed:) Filed August 14th, A. D. 1874. L. S. B. Sawyer, clerk, by J. F. O'Beirne, deputy clerk.

173 *Reissued letters patent No. 4818 to U. S. Blasting Oil Co.*

4818.

THE U. S. [Vignette] PATENT OFFICE.

To all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of

this office of the revised letters patent granted the United States Blasting Oil Company, dated March 19th, 1872, No. 4818, for imp't in useful compounds containing nitro-glycerine.

In testimony whereof I, J. M. Thacher, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this fifteenth day of December, in the year of our Lord one thousand eight hundred and seventy-three, and of the Independence of the United States the ninety-eighth.

J. M. THACHER.
Acting Commissioner.

174 No. 4818.] [Vignette.] [Reissue.

The United States of America to all to whom these presents shall come:

Whereas Alfred Nobel, of Hamburg, Germany, assignor to the United States Blasting Oil Company of New York, New York, has presented to the Commissioner of Patents a petition praying for the reissue of letters patent for an alleged new and useful improvement in useful compounds containing nitro-glycerine (for which letters patent were issued to him, dated October 24, 1865; the same surrendered, and new letters issued to said assignee, dated April 13, 1869, which letters having been surrendered, the same have been cancelled, and new letters ordered to issue to it on two separate amended specifications), a description of which invention is contained in the specification, of which a copy is hereunto annexed and made a part hereof, and has complied with the various requirements of law in such cases made and provided; and

whereas, upon due examination made, the said claimant is ad-
175 judged to be justly entitled to a patent under the law:

Now, therefore, these letters patent are to grant unto the said The United States Blasting Oil Company, its successors or assigns, for the term of seventeen years from the twenty-fourth day of October, one thousand eight hundred and sixty-five, the exclusive right to make, use, and *and* vend the said invention throughout the United States and the Territories thereof.

In testimony whereof I have hereunto set my hand and caused the seal of the Patent Office to be affixed, at the city of Washington, this nineteenth day of March, in the year of our Lord one thousand eight hundred and seventy-two, and of the Independence of the United States of America the ninety-sixth.

[L. S.]

B. R. COWEN,
Acting Secretary of the Interior.

Countersigned:
M. D. LEGGETT,
Commissioner of Patents.

176 4818.

UNITED STATES PATENT OFFICE.

Alfred Nobel, of Hamburg, Germany, assignor to the United States Blasting Oil Company of New York, N. Y. Improvement in useful compounds containing nitro-glycerine. Specification forming part of letters patent No. 50617, dated October 24, 1865; reissue No. 3380, dated April 13, 1869; reissue No. 4818, dated March 19, 1872. Division D.

Specification.

To all whom it may concern:

Be it known that Alfred Nobel, of the city of Hamburg, Germany,

has invented certain new and useful improvements in the manufacture of nitro-glycerine and certain compounds thereof, and in the utilization, as explosives, of nitro-glycerine and the analogous substances
177 known as nitrates of ethyl and of methyl and nitro-manite.

The improvement in the manufacture of nitro-glycerine is the subject of a separate specification; this specification having reference to certain modes of utilizing, as explosives, nitro-glycerine and the analogous substances above mentioned.

There is a class of explosives long known, but not at the date of Nobel's invention applied to technical purposes in consequence of practical difficulties in procuring their explosion. Such substances are nitro-glycerine, the nitrates of ethyl and of methyl and nitro-manite. These substances are liquid at ordinary temperatures, and by that characteristic are distinguishable from solid explosives such as gunpowder, gun-cotton, &c.; and they have also the property that fire may be applied to them without their exploding. Nitro-glycerine, for example, if ignited in an open space, is slowly decomposed and takes fire, but the flame is apt to die out when the match is withdrawn; hence it cannot, under ordinary circumstances, be looked upon as a ready explosive agent, for while gunpowder and other substances used as explosives prior to Nobel's invention always explode or deflagrate throughout their whole mass when fire is set to them, nitro-glycerine and the analogous
178 substances before named will not explode from the mere contact of flame. So, also, if a drop of nitro-glycerine be poured on an anvil the blow of a hammer causes it to explode, but only that part is involved which has received the blow, so that in this case the explosion is merely a local one.

A principal object of Noble's invention consists in the removal of this obstacle to the use of nitro-glycerine and the analogous substances before named as explosives. For this end two different methods have been invented by Nobel for promoting the explosion of nitro-glycerine. One method, which forms the subject of this patent, relates to a compound with nitro-glycerine of other more easily explosive substances, and the other method, which is described in a separate specification, relates to the means of effecting the explosion.

Nobel discovered that the difficulty experienced in effecting the explosion of nitro-glycerine and the analogous substances before mentioned could be overcome by mixing or combining them with gunpowder, gun-cotton, or other similar substance. This mixing may be effected in any convenient manner, and the proportions in which they are to be combined may be varied to suit the pleasure or convenience of
179 the user or manufacturer. The nitro-glycerine may be mixed with gunpowder or gun-cotton, either of which will absorb a considerable quantity of nitro-glycerine, say thirty per cent., more or less, in such proportions as to make the compound either wet or comparatively dry. If mixed with gunpowder, it may be either absorbed with it by pouring the nitro-glycerine on the mass of gunpowder, or the two may be mingled together by trituration, the powder in the nitro-glycerine.

The effect of these combinations will produce an explosive especially suitable for certain blasting purposes, for example, in crevice-rock, and greatly superior either to gunpowder or gun-cotton in explosive force, and quite readily exploded, so that it may be fired and exploded by means of a match or electric spark in like manner as gunpowder or gun-cotton alone. By means of this combination, with gunpowder, gun-cotton, or other similar readily-explosive substances, of nitro-glycerine

and the analogous substances before named, which are liquid at the ordinary temperature, these substances, which had not at the date of Nobel's invention been applied to any technical use as explosives, owing to their difficulty of explosion, have been introduced from the
180 domain of science into that of practical use in the arts, and have rendered of commercial value what was previously known as a mere chemical curiosity.

We therefore claim as the invention of said Alfred Nobel, and desire to secure by letters patent in the name of the United States Blasting Oil Company, as assignee of said Nobel—

1. The utilization, as explosives, of nitro-glycerine and the analogous liquid substances hereinbefore mentioned, by combining therewith gunpowder, gun-cotton, or other similar substance developing a rapid heat on combustion, substantially as hereinbefore described.

2. The combination of gunpowder with nitro-glycerine, substantially as and for the purposes hereinbefore described.

3. The combination or gun-cotton with nitro glycerine, substantially as and for the purposes hereinbefore described.

In witness whereof the said The United States Blasting Oil Company, by Tal. P. Shaffner, president, have hereunto set their hand.

THE UNITED STATES BLASTING OIL CO.,
By TAL. P. SHAFFNER, *President.*

Witnesses:
OCTAVIUS KNIGHT.
EDM. F. BROWN.

181 (Endorsed:) Filed 14 August, A. D. 1874. L. S. B. Sawyer, clerk, by J. F. O'Beirne, deputy clerk.

182 *Reissued letters patent No. 4819 to U. S. Blasting Oil Co.*

4819.

THE U. S. [vignette] PATENT OFFICE.

To all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the reissued letters patent granted the United States Blasting Oil Company, dated March 19, 1872, No. 4819, for "imp't in nitro-glycerine compounds.

In testimony whereof I, J. M. Thacher, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this fifteenth day of December, in the year of our Lord one thousand eight hundred and seventy-three, and of the Independence of the United States the ninety-eighth.

[SEAL.]

J. M. THACHER,
Acting Commissioner.

183 No. 4819.] [Vignette.] [Reissue.

The United States of America to all to whom these presents shall come:

Whereas Alfred Nobel, of Hamburg, Germany, assignor to the United States Blasting Oil Company of New York, New York, has presented to the Commissioner of Patents a petition praying for the reissue of letters patent for an alleged new and useful improvement in nitro-glycerine compounds (for which letters patent were issued to him dated October

24, 1865; the same surrendered and new letters issued to said assignee, dated April 13, 1869, which last letters having been surrendered, the same have been cancelled and new letters ordered to issue to it on two separate amended specifications), a description of which invention is contained in the specification of which a copy is hereunto annexed and made a part hereof, and has complied with the various requirements of law in such cases made and provided; and whereas, upon due examination made, the said claimant is adjudged to be justly entitled to a
184 patent under the law:

Now, therefore, these letters patent are to grant unto the said The United States Blasting Oil Company, its successors or assigns, for the term of seventeen years from the twenty-fourth day of October, one thousand eight hundred and sixty-five, the exclusive right to make, use, and vend the said invention throughout the United States and the Territories thereof.

In testimony whereof I have hereunto set my hand and caused the seal of the Patent Office to be affixed, at the city of Washington, this 19th day of March, in the year of our Lord one thousand eight hundred and seventy-two, and of the Independence of the United States of America the ninety sixth.

[L. S.]

B. R. COWEN,
Acting Secretary of the Interior.

Countersigned:
M. D. LEGGETT,
Commissioner of Patents.

185 4819.

UNITED STATES PATENT OFFICE.

Alfred Nobel, of Hamburg, Germany, assignor to the United States Blasting-Oil Company, of New York, N. Y. Improvement in nitro-glycerine compounds. Specification forming part of letters patent No. 50617, dated October 24, 1865; reissue No. 3380, dated April 13, 1869; reissue No. 4819, dated March 19, 1872. Division E.

Specification.

To all whom it may concern:

Be it known that Alfred Nobel, of the city of Hamburg, Germany, has invented certain new and useful improvements in the manufacture of nitro-glycerine, and certain compounds thereof, and in the utilization of nitro-glycerine as an explosive.

186 The improvement in the manufacture of nitro-glycerine is the subject of a separate specification, this specification having reference to the utilization of nitro-glycerine as an explosive.

Nitro-glycerine belongs to a class of explosives long known, but not at the date of Nobel's invention applied to technical purposes in consequence of practical difficulties in procuring their explosion. Nitro-glycerine is liquid at ordinary temperatures, and by that characteristic is distinguishable from solid explosives, such as gunpowder, gun-cotton, &c., and has also the property that fire may be applied to it without its exploding. Nitro-glycerine, for example, if ignited in an open space is slowly decomposed and takes fire, but the flame is apt to die out when the match is withdrawn; hence it cannot, under ordinary circumstances, be looked upon as a ready explosive agent, for, while gunpowder and

other substances used as explosives prior to Nobel's invention always explode when fire is set to them, nitro-glycerine will not explode from the mere contact of flame. So, also, if a drop of nitro-glycerine be poured on an anvil, the blow of a hammer causes it to explode, but only that part is involved which has received the blow, so that in
187 this case the explosion is merely a local one.

A principal object of Nobel's invention consists in the removal of this obstacle to the use of nitro-glycerine as an explosive. For this end two different methods have begn invented by Nobel for promoting the explosion of nitro-glycerine; one method, which forms the subject of this patent, consists in a compound with nitro-glycerine of a readily-ignitible substance, and the other method, which is described in a separate specification, relates to the means of effecting the explosion.

Nobel discovered that, by mixing nitro-glycerine with rocket-powder, which is a mere loose mechanical mixture of niter, charcoal, and sulphur, the difficulty in effecting the explosion of nitro-glycerine was effectually overcome. Rocket-powder is almost non-explosive, but readily burns and deflagrates on contact with a spark of fire, while nitro-glycerine, on the other hand, as before stated, is hard to explode, but when the explosion is obtained is extremely violent in its effects.

By the mixing of these substances a compound is produced which is a very powerful explosive, and is easily exploded by means of the
188 simple contact with fire. The mixing may be effected in any convenient manner, and the proportions in which they are combined may be varied to suit the pleasure or convenience of the user or manufacturer.

What, therefore, we claim as the invention of Alfred Nobel, and desire to secure by letters patent, is the mixture of nitro-glycerine and rocket-powder, substantially as and for the purposes hereinbefore described.

In witness whereof the said The United States Blasting-Oil Company, by Tal. P. Shaffner, president, have hereunto set their hand.

THE UNITED STATES BLASTING-OIL CO.,
By TAL. P. SHAFFNER,
President.

Witnesses:
OCTAVIUS KNIGHT.
EDM. F. BROWN.

(Endorsed:) Filed August 14th, A. D. 1874. L. S. B. Sawyer, clerk, by J. F. O'Beirne, deputy clerk.

189 *Reissued letters patent No. 5619 to U. S. Blasting-Oil Co.*

THE U. S. [vignette] PATENT OFFICE.

To all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the reissue letters patent granted The Giant Powder Company dated October 1st, 1873, No. 5619 for improvement in explosive compounds.

In testimony whereof I, J. M. Thacher, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this second day of May, in the year of our Lord one thousand eight hundred and seventy-four, and of the Independence of the United States the ninety-eighth.

[SEAL.]

J. M. THACHER,
Acting Commissioner.

190 No. 5619.] [Vignette.] [Reissue.

THE UNITED STATES OF AMERICA.

To all to whom these presents shall come:

Whereas Alfred Nobel, of Hamburg, Germany, assignor, by mesne assignments to the Giant Powder Company, of San Francisco, California, said assignee having presented to the Commissioner of Patents a petition praying for the reissue of letters patent for an alleged new and useful improvement in explosive compounds (for which letters patent were issued to Julius Bandmann, dated May 26, 1868, which letters having been surrendered, the same have been cancelled, and new letters ordered to issue to said assignee on an amended specification), a description of which invention is contained in the specification of which a copy is hereunto annexed, and made a part hereof, and has complied with the various requirements of law in such cases made and pro-
191 vided; and whereas, upon due examination made, the said claimant is adjudged to be justly entitled to a patent under the law:

Now, therefore, these letters patent are to grant unto the said The Giant Powder Company, its successors or assigns, for the term of seventeen years from the twenty-sixth day of May, one thousand eight hundred and sixty-eight, the exclusive right to make, use, and vend the said invention throughout the United States and the Territories thereof.

In testimony whereof I have hereunto set my hand and caused the seal of the Patent Office to be affixed, at the city of Washington, this twenty-first day of October, in the year of our Lord one thousand eight hundred and seventy-three, and of the Independence of the United States of America the ninety-eighth.

[L. S.] B. R. COWEN,
Acting Secretary of the Interior.

Countersigned:
M. D. LEGGETT,
Commissioner of Patents.

192 UNITED STATES PATENT OFFICE.

Alfred Nobel, of Hamburg, Germany, assignor, by mesne assignments, to the Giant Powder Company of San Francisco, Cal. Improvement in explosive compounds. Specification forming part of letters patent No. 78317, dated May 26, 1868; reissue No. 5619, dated October 21, 1873; application filed October 14, 1873.

To all whom it may concern:

Be it known that I, Alfred Nobel, of the city of Hamburg, in the empire of Germany, have invented an improved explosive compound, of which the following is a specification:

This invention relates to a new and useful combination or mixture of nitro-glycerine with some absorbent substance, whereby the condition of the nitro-glycerine is so modified as to render the resulting
193 explosive compound more practically useful and effective as an explosive, and far more safe and convenient for handling, storage, and transportation than nitro-glycerine in its ordinary condition as a liquid. The invention consists in combining or mixing with nitro-glycerine some porous or absorbent substance, which, being free from any quality which will cause it to decompose, destroy, or injure the nitro-

glycerine, forms, in combination with it, an explosive compound possessing certain marked properties of great practical utility, which not only increase its efficiency, but also obviate many of the serious practical objections to the employment of nitro-glycerine as an explosive. Some of these peculiar properties of this mixture will be briefly stated.

Nitro-glycerine being a liquid, it is usually necessary, in exploding it as an explosive for blasting purposes, to place it in cases or cartridges formed of paper, metal, or other substance, which must, of course, be of somewhat smaller diameter than the bore-holes, as, if not so inclosed, the nitro-glycerine would permeate the seams of the rock and prove highly dangerous to the miner, on account of its liability to ex-
194 plode in subsequent drillings; but by means of this invention the nitro-glycerine, being held in combination with the porous or absorbent substance with which it is mixed, and then assuming the altered form of a powder or paste, remains in the bore-hole in which it is placed without leaking through the seams of the rock.

Another advantage over liquid nitro-glycerine is, that this mixture can be made to fill the bore-hole more closely than a cartridge-case will, owing to the irregularities of shape of the hole, which greatly increases its efficiency. The liability of fluid nitro-glycerine to accidental explosion from agitation or concussion renders its handling or transportation very dangerous. This danger is, however, almost entirely obviated by the use of the compound described in this specification, because when mixed with a suitable absorbent the nitro-glycerine is far less sensitive to shocks than when in a liquid condition, so that it may be handled in mass, either loose or in packages, with impunity. So much is this the case that when this mixture is packed in a wooden case or box the inclosure may be knocked to pieces without danger of exploding its contents.

195 This invention, then, consists in mixing liquid nitro-glycerine with some solid (as distinguished from liquid or fluid) substance, which will absorb and retain a sufficient amount of nitro-glycerine to form an efficient explosive. The substance which is believed to be the best adapted for this purpose is a kind of silicious earth, found in various parts of the globe, and known by the various names of silicious marl, tripoli, and rotten-stone.

The peculiar variety of this material best suited for this use is homogeneous, has a low specific gravity and great absorbent capacity, and is generally composed of the remains of infusoria. So great is the absorbent capacity of this infusorial earth that when in a pulverized condition it will take up about three times its own weight of liquid nitro-glycerine and still retain the form of a powder. Other porous substances, even though they have less absorbent capacity, may be used, but in this case the explosive strength of the powder will be diminished, owing to the smaller proportion of nitro-glycerine contained therein. Chalk, for example, will absorb about fifteen per cent. of nitro-glycerine and retain its powdered condition; and porous charcoal, although of greater absorbent capacity, has less elasticity of particles, so
196 that the nitro-glycerine is apt to squeeze out of it. Any of the various vegetable or mineral substances susceptible of pulverization or comminution, and which will retain nitro-glycerine by absorption, may be substituted for infusorial earth.

The relative proportion of the ingredients used in making this new explosive compound will vary according to the absorbent capacity of the substance mixed with the nitro-glycerine, it being preferable in all cases, and this is the only limit, to use so much only of the liquid nitro-

glycerine as the absorbent substance will retain without liability to subsequent separation by compression or leakage. Where the absorbent used in a powdered condition is infusorial earth, a thin paste or semi-fluid condition of the mixture is to be avoided.

The method of making this new explosive compound with infusorial earth is as follows: The earth being first thoroughly dried and pulverized, is placed in any suitable vessel, and the nitro-glycerine is then gradually introduced and thoroughly mixed with the powdered earth, which is effected either by stirring with the naked hand, or by means of any suitable wooden instrument, worked either by machinery
197 or by hand. Where infusorial earth is used the proportions may be conveniently varied, from sixty parts, by weight, of liquid nitro-glycerine, and forty parts, by weight, of infusorial earth, to seventy-eight parts, by weight, of nitro-glycerine, and twenty-two parts, by weight, of infusorial earth; the former proportions forming, at ordinary temperatures, a dry pulverulent mass, and the latter a pasty mixture.

These proportions may, however, be varied outside of the limits above stated, it being observed that the explosive force of the mixture is increased where a larger proportion of nitro-glycerine is employed, and that when the mixture is to be used in a cold climate a larger quantity of nitro-glycerine may be safely employed than when it is to be exposed to a warmer atmosphere. For ordinary practical purposes a mixture of seventy-five parts, by weight, of nitro-glycerine, and twenty-five parts, by weight, of infusorial earth, gives a powder sufficiently dry at ordinary temperatures, and which is susceptible of compression to a specific gravity nearly equal to that of pure nitro-glycerine.

When the ingredients have been intimately mixed, and thoroughly incorporated by stirring and kneading, the compound may be
198 rubbed through a sieve made of hair, silk, or brass wire, and any lumps which remain may be powdered by rubbing them through the sieve with a stiff bristle-brush. The powder is then ready for use, and may be packed in bulk in boxes, or compressed into cartridge-cases made of paper, of such convenient sizes as may be most in demand for blasting purposes. A greater or less degree of fineness of grain may be given to the powder by using a fine or coarse sieve.

In using this improved explosive compound for blasting, it may be inserted into cartridge-cases, as above stated, or without any inclosure or wrapping, as may be preferred. For the best effect it should be pressed firmly down so as to fill the bore-hole, whether in cartridge or not, a small quantity at a time with a wooden rod, until it is firmly packed. If the cartridges are smaller than the bore the pressure will burst them, and allow the powder to spread laterally and fill the bore. It may be easily and efficiently exploded by means of an ordinary blasting fuse inserted into the open end of a percussion cap, the metallic edges of the cap being compressed or crimped tightly and firmly
199 around the fuse, so as to hold it in place, with the end of the fuse in close contact with the fulminate in the percussion cap. The capped end of the fuse is then inserted into the explosive powder, which is pressed closely around it in the bore-hole, and a tamping of sand or other suitable material may be placed above the charge of powder and pressed down upon it.

The fuse thus applied is fired in the ordinary manner, and when the fire reaches the percussion cap it explodes, which effects the immediate explosion of the charge of explosive compound. It is better to use a percussion cap having a heavy charge of fulminate in order to insure an explosion of the powder, although under favorable circumstances it

might be exploded with an ordinary fuse without any cap; but this method is too uncertain to be relied upon.

For ordinary blasting the bore-holes may be about one-half the size, and the charge of explosive compound about one-fifth the quantity that would be made use of when gunpowder is used as the explosive.

What we claim as the invention of Alfred Nobel, and desire to secure by letters patent in the name of the Giant Powder Company, and
200 the Atlantic Giant Powder Company, as assignees (through mesne assignments) of the said Alfred Nobel, is the combination of nitro-glycerine with infusorial earth, or other equivalent absorbent substance, as a new explosive compound.

[L. S.] GEO. C. HICKOX,
President of the Giant Powder Co.

Witnesses:
H. PICHOIS.
A. BLACK.

(Endorsed:) Filed August 14, 1874. L. S. B. Sawyer, clerk, by J. F. O'Beirne, deputy clerk.

201 *Reissued letters patent No. 5799.*

No. 5799.] [Reissue.

The United States of America to all to whom these presents shall come:

Whereas ha presented to the Commissioner of Patents a petition praying for the of letters patent for an alleged new and useful , a description of which invention is contained in the specification of which a copy is hereunto annexed and made a part hereof, and hav complied with the various requirements of law in such cases made and provided; and whereas upon due examination made the said claimant adjudged to be justly entitled to a patent, under the law:

Now, therefore, these letters patent are to grant unto the said or assigns, for the term of years from the day of ,
202 one thousand eight hundred and , the exclusive right to make, use, and vend the said invention throughout the United States and the Territories thereof.

In testimony whereof I have hereunto set my hand and caused the seal of the Patent Office to be affixed at the city of Washington, this day of , in the year of our Lord one thousand eight hundred and , and of the Independence of the United States of America the .

[SEAL.]

Secretary of the Interior.

Countersigned:

Commissioner of Patents.

203 UNITED STATES PATENT OFFICE.

Alfred Nobel, of Hamburg, Germany, assignor, by mesne assignments, to the Giant Powder Company of San Francisco, Cal. Improvement in explosive compounds. Specification forming part of letters patent No. 78317, dated May 26, 1868; reissue No. 5619, dated October 21, 1873; reissue No. 5799, dated March 17, 1874; application filed March 11, 1874.

To all whom it may concern:

Be it known that Alfred Nobel, of the city of Hamburg, in the Empire

of Germany, have invented an improved explosive compound, of which the following is a specification:

This invention relates to a new and useful combination or mixture of nitro-glycerine with some absorbent substance, whereby the con-
204 dition of the nitro-glycerine is so modified as to render the resulting explosive compound more practically useful and effective as an explosive, and far more safe and convenient for handling, storage, and transportation than nitro-glycerine in its ordinary condition as a liquid.

The invention consists in combining or mixing with nitro-glycerine some porous or absorbent substance, which, being free from any quality which will cause it to decompose, destroy, or injure the nitro-glycerine, forms, in combination with it, an explosive compound possessing certain marked properties of great practical utility, which not only increase its efficiency, but also obviate many of the serious practical objections to the employment of nitro-glycerine as an explosive. Some of these peculiar properties of this mixture will be briefly stated.

Nitro-glycerine being a liquid, it is usually necessary, in exploding it as an explosive for blasting purposes, to place it in cases or cartridges formed of paper, metal, or other substance, which must, of course, be of somewhat smaller diameter than the bore-holes, as if not so inclosed the nitro-glycerine would permeate the seams of the rock, and
205 prove highly dangerous to the miner on account of its liability to explode in subsequent drillings, but, by means of this invention, the nitro-glycerine being held in combination with the porous or absorbent substance with which it is mixed, and then assuming the altered form of a powder or paste, remains in the bore-hole in which it is placed without leaking through the seams of the rock.

Another advantage over liquid nitro-glycerine is, that this mixture can be made to fill the bore-hole more closely than a cartridge-case will, owing to the irregularities of shape of the hole, which greatly increases its efficiency. The liability of fluid nitro-glycerine to accidental explosion from agitation or concussion renders its handling and transportation very dangerous. This danger is, however, almost entirely obviated by the use of the compound described in this specification, because when mixed with a suitable absorbent, the nitro-glycerine is far less sensitive to shocks than when in a liquid condition, so that it may be handled in mass, either loose or in packages, with impunity. So much is this the case that, when this mixture is packed in a wooden case or box, the inclosure may be knocked to pieces without danger of
206 exploding its contents.

This invention, then, consists in mixing liquid nitro-glycerine with some solid (as distinguished from liquid or fluid) substance which will absorb and retain a sufficient amount of nitro-glycerine to form an efficient explosive. The substance which is believed to be the best adapted for this purpose is a kind of silicious earth found in various parts of the globe, and known by the various names of silicious marl, tripoli, and rotten stone. The peculiar variety of this material best suited for this use is homogeneous, has a low specific gravity and great absorbent capacity, and is generally composed of the remains of infusoria. So great is the absorbent capacity of this infusorial earth that when in a pulverized condition it will take up about three times its own weight of liquid nitro-glycerine, and still retain the form of a powder. Other porous substances, even though they have less absorbent capacity, may be used, but in this case the explosive strength of the powder will be diminished, owing to the smaller proportion of nitro-glycerine con-

tained therein. Chalk, for example, will absorb about fifteen per
207 cent. of nitro-glycerine and retain its powdered condition, and porous charcoal, although of greater absorbent capacity, has less elasticity of particles, so that the nitro-glycerine is apt to squeeze out of it. Any of the various vegetable or mineral substances susceptible of pulverization or comminution, and which will retain nitro-glycerine by absorption, may be substituted for infusorial earth.

The relative proportion of the ingredients used in making this new explosive compound will vary according to the absorbent capacity of the substance mixed with the nitro-glycerine, it being preferable in all cases, and this is the only limit, to use so much only of the liquid nitro-glycerine as the absorbent substance will retain without liability to subsequent separation by compression or leakage. Where the absorbent used in a powdered condition is infusorial earth, a thin paste or semi-fluid condition of the mixture is to be avoided.

The method of making this new explosive compound with infusorial earth is as follows: The earth, being first thoroughly dried and *and* pulverized, is placed in any suitable vessel, and the nitro-glycer-
208 ine is then gradually introduced and thoroughly mixed with the powdered earth, which is effected either by stirring with the naked hand or by means of any suitable wooden instrument, worked either by machinery or by hand. Where infusorial earth is used, the proportions may be conveniently varied, from sixty parts, by weight, of liquid nitro-glycerine, and forty parts, by weight, of infusorial earth, to seventy-eight parts, by weight, of nitro-glycerine, and twenty-two parts, by weight, of infusorial earth, the former proportions forming, at ordinary temperatures, a dry pulverulent mass, and the latter a pasty mixture.

These proportions may, however, be varied outside of the limits above stated, it being observed that the explosive force of the mixture is increased where a larger proportion of nitro-glycerine is employed, and that when the mixture is to be used in a cold climate a larger quantity of nitro-glycerine may be safely employed than when it is to be exposed to a warmer atmosphere. For ordinary practical purposes, a mixture of seventy-five parts, by weight, of nitro-glycerine, and twenty-five parts, by weight, of infusorial earth gives a powder sufficiently
209 dry at ordinary temperatures, and which is susceptible of compression to a specific gravity nearly equal to that of pure nitro-glycerine.

When the ingredients have been intimately mixed and thoroughly incorporated by stirring and kneading, the compound may be rubbed through a sieve made of hair, silk, or brass wire, and any lumps which remain may be powdered by rubbing them through the sieve with a stiff bristle brush. The powder is then ready for use, and may be packed in bulk or boxes, or compressed into cartridge-cases made of paper, of such convenient sizes as may be most in demand for blasting purposes. A greater or less degree of fineness of grain may be given to the powder by using a fine or coarse sieve.

In using this improved explosive compound for blasting, it may be inserted into cartridge-cases, as above stated, or without any inclosure or wrapping, as may be preferred. For the best effect it should be pressed firmly down so as to fill the bore hole, whether in cartridge or not, a small quantity at a time, with a wooden rod, until it is firmly packed.

If the cartridges are smaller than the bore the pressure will
210 burst them, and allow the powder to spread laterally and fill the bore. It may be easily and efficiently exploded by means of an ordinary blasting-fuse inserted into the open end of a percussion cap, the

metallic edges of the cap being compressed or crimped tightly and firmly around the fuse, so as to hold it in place, with the end of the fuse in close contact with the fulminate in the percussion cap. The capped end of the fuse is then inserted into the explosive powder, which is pressed closely around it in the bore-hole, and a tamping of sand or other suitable material may be placed above the charge of powder and pressed down upon it.

The fuse thus applied is fired in the ordinary manner, and when the fire reaches the percussion cap it explodes, which effects the immediate explosion of the charge of explosive compound. It is better to use a percussion-cap having a heavy charge of fulminate, in order to insure an explosion of the powder, although under favorable circumstances it might be exploded with an ordinary fuse without any cap; but this method is too uncertain to be relied upon.

211 For ordinary blasting, the bore-holes may be about one-half the size, and the charge of explosive compound about one-fifth the quantity that would be made use of when gunpowder is used as the explosive.

What we claim as the invention of Alfred Nobel, and desire to secure by letters-patent, in the name of the Giant Powder Company, as assignee (through mesne assignments) of the said Alfred Nobel, is, the combination of nitro-glycerine with infusorial earth, or other equivalent absorbent substance, as a new explosive compound.

In witness whereof the said Giant Powder Company affixes its seal, and the president of the same his official signature, this 29th day of January, 1874.

[L. S.] THE GIANT POWDER CO.,
By GEO. C. HICKOX, *President*.

Witnesses:
H. PICHOIS.
JORDAN W. ROPER.

(Endorsed:) Filed August 14, 1874. L. S. B. Sawyer, clerk, by J. F. O'Beirne, deputy clerk.

212 *Notice that copies of letters patent mentioned in the bill of complaint have been filed.*

United States circuit court, district of California, ninth circuit.

THE GIANT POWDER CO., COMPLAINANT,
vs.
THE CALIFORNIA POWDER WORKS ET AL., RESPONDENTS.

MESSRS. GREATHOUSE & HAGGIN,
Solicitors for Respondents:

GENTLEMEN: You will please take notice that the complainant in this cause has filed with the clerk of the above court copies of the several letters patent mentioned in the bill of complaint herein filed.

Yours, &c.,

M. A. WHEATON AND
ALFRED RIX
Solicitors for Complainant.

HALL MCALLISTER,
Of Counsel.

(Endorsed:)

213 Received a copy this 14th day of August, A. D. 1874.
GREATHOUSE & HAGGIN,
Solicitors for Resp'd'ts.

(Endorsed:) Filed 14 Aug'st, 1874. L. S. B. Sawyer, clerk, by J. F O'Beirne, deputy clerk.

214 *Opinion of Mr Justice Field.*

In the circuit court of the United States of the ninth judicial circuit in and for the district of California.

THE GIANT POWDER COMPANY
vs.
THE CALIFORNIA POWDER WORKS ET AL.

This is a suit for an alleged infringement of three letters patent, with a prayer that the defendants be decreed to account for and pay to the complainants the gains and profits derived by them from the manufacture, use, or sale of the invention patented, and be restrained from further infringement.

All of these patents are reissued letters. They purport to be founded, two of them upon an original patent issued to Alfred Nobel, in October 1865, and the other one upon an original patent issued to an assignee of Nobel, in April 1868. Upon the validity of the latter reissue no question is made. The validity of the other reissues is assailed upon the alleged ground that they describe and claim a different invention from that described and claimed in the original patent; and their validity is the question presented by the demurrer.

215 The several patents, original and reissued, are referred to in the bill and made part of it, so that the question raised as to the validity of the reissues is distinctly presented. It appears from inspection of the schedule annexed to the original patent to Nobel, of October 1865, giving a description of his alleged invention, and which constitutes a part of the patent, that he declares that he has "invented the use of nitro-glycerine or analogous substances as a substitute for gunpowder," and then proceeds to indicate the manner in which the nitro-glycerine can be used, so that the "liquid which when exposed cannot be wholly decomposed and exploded, shall by confinement be subjected to heat and pressure, by which its total and immediate decomposition and explosion" may be effected.

There is no mention in the schedule of any mixture of the nitro-glycerine with other substances so as to form a new compound. The only reference to any mixture is in a paragraph which in describing the manner of using the nitro-glycerine states that it should be first prepared by adding a mixture of sulphuric and nitric acids. The schedule then gives in detail four modes in which the explosion of the

216 nitro-glycerine can be effected; the first is by exploding in contact with it a quantity of gunpowder confined in a water-proof tube or case; the second is by an electric spark, or by passing a powerful current of electricity through a fine wire immersed in the liquid; the third is by inserting in the liquid a thin case containing lime and water or any substances which on combining evolve heat; and the fourth is by a fuse.

The schedule closes by a declaration that what the patentee claimed as his invention and desired to secure by letters patent was "the use of nitro-glycerine or its equivalent, substantially in the manner and for the purpose described."

It is plain from this statement that the patent was for a process and not for a compound. It was for modes of using the liquid, and not for any new compound of known or unknown ingredients.

In the following year, in June, 1866, Nobel, whose letters patent extended for seventeen years, assigned his interest in them and the invention secured, for the residue of that period, to the United States Blasting Oil Company, a corporation created under the laws of New
217 York. In April, 1869, this company surrendered the original letters and obtained in their place four new divisional letters patent for the residue of the period then unexpired, designated respectively as reissue No. 3377, division A; reissue No. 3378, division B; reissue No. 3379, division C; reissue No. 3380, division D.

In March, 1872, the company surrendered this last divisional reissue designated No. 3380, division D, and obtained for it two new divisional letters patent numbered and designated as reissue No. 4818, division D, and reissue No. 4819, division E. It is with reference to the validity of these two last reissues that the contention in this case arises. No. 4818 is for two compounds, one consisting of nitro-glycerine and gunpowder, and the other of nitro-glycerine and gun-cotton; No. 4819 is for a compound consisting of nitro-glycerine and rocket-powder. Neither of these reissued patents is for any process or mode of exploding nitro-glycerine, or for any particular use of the liquid. Both of them are for new compounds, made by uniting old and well-known substances.

There is no connection or relation between the inventions or dis-
218 coveries covered by them and the invention or discovery described and claimed in the original patent. If, therefore, we are restricted in our examination to the original patent and the schedule annexed, the reissues cannot be sustained. Can we look beyond that patent and schedule, which is a part of the patent, to ascertain what the original patentee had in fact at the time invented or discovered, though not described in his specifications or covered by his claim?

The statute of 1870, under which these reissues were granted, provides that "whenever any patent is inoperative or invalid by reason of a defective or insufficient specification, or by reason of the patentee claiming as his own invention or discovery more than he had a right to claim as new, if the error has arisen by inadvertence, accident, or mistake, and without any fraudulent or deceptive intention, the Commissioner shall, on surrender of such patent and the payment of the duty required by law, cause a new patent for the same invention, and in accordance with the corrected specifications, to be issued to the patentee"; and the
219 Commissioner is authorized in his discretion to cause several patents to be issued for distinct and separate parts of the thing patented upon demand of the applicant. But the act declares that "no new matter shall be introduced into the specifications, nor in case of a machine patent shall the model or drawings be amended except each by the other; but when there is neither model nor drawing amendments may be made upon proof satisfactory to the Commissioner that such new matter or amendment was part of the original invention, and was omitted from the specification by inadvertence, accident, or mistake, as aforesaid."

It is by this law that the last reissues must be determined. As here provided no reissue is permitted unless the original patent is inoperative or invalid from a defective or insufficient specification, or the claim of the patentee exceeds his right; and then only in case the error committed has arisen in the manner indicated. In determining the propriety of the reissue no new matter can be introduced into the specification, except in case of a machine patent, to which class the one under consideration does not belong. It is only with respect to patents
220 of that character where no model or drawing exists, that in our

judgment any notice can be taken by the Commissioner of matter outside of the original specification and claim. (Tarr vs. Webb, 5 Fish., 596.)

In machine patents models and drawings can be examined in connection with the specification, and the latter changed, restricted, or enlarged so as fully to describe the actual invention made. If the patent do not relate to a machine, the specification, if defective, may be made more definite and certain so as to embrace the claim made, or the claim may be so modified as to correspond with the specification. But this is the extent, in our judgment, to which modifications can be made in such cases.

Judged by this law, there can be in our opinion no reasonable doubt as to the invalidity of the reissues. The original patent to Nobel was neither inoperative nor invalid by reason of any defective or insufficient specification. That specification was unambiguous, and covered all that was claimed. And if this were otherwise no new matter not relating to the process claimed, but relating to a compound made
221 by uniting glycerine with other substances, could be added to the specification. This is the explicit provision of the statute.

If Nobel had made other inventions or discoveries—compounds of nitro-glycerine with other substances or different modes of using the liquid, (as it would seem from the memorandum annexed to the bill that he had), he might have applied for and obtained separate patents for them. (Sarven v. Hall, 9 Blatchford, 526.) But such compounds or different modes of use cannot be included in a reissued patent when the original never embraced them without sanctioning a doctrine which would open the door to all sorts extortion and fraud, and impose an oppressive burden upon the industries of the country.

By the terms of the statute a reissue must be for the same invention which is embraced by the original patent, or if the reissue be in divisional parts, each division must be for some distinct and separate part of that invention. The two letters patent under consideration in the present case are not only for inventions not embraced by the orig-
222 inal patent, but are not embraced by the first reissue, upon the surrender of which they were reissued, designated as reissue No. 3380, division D. That reissue was only for a process, a mode of applying and using nitro-glycerine, simple or compounded, and not for any new explosive compounds, as inaccurately stated in the bill. This will be seen by examination of the letters referred to and made part of the bill.

The two letters issued upon the surrender of that reissue are therefore invalid within the ruling of Chief-Justice Taney, in Knight vs. The Baltimore and Ohio Railroad Company (3 Fisher, 1), and might have been disposed of without showing as we have done that they were invalid because they were for inventions not covered by the original patent.

We do not question the doctrine so earnestly pressed by counsel upon the argument that all presumptions in support of the action of the Commissioner in granting the reissues must be indulged, and that his ruling upon all matters not apparent upon the face of the patents themselves cannot be collaterally assailed. We rest our judgment upon a comparison of the original and the reissued patents, and hold as a mat-
223 ter of construction that the latter are not on their face issued for the same invention, or any distinct and separate part thereof; and that for this reason the Commissioner exceeded his authority in issuing them. (Seymour vs. Osborne, 11 Wal., 544.)

The defendants must have judgment on the demurrer, with leave to the complainant to amend the bill by striking out all such parts as relate to the reissued patents No. 4818 and 4819.

(Signed) FIELD, *J.*

(Endorsed:) Read in open court Sept'r 22d, 1875. L. S. B. Sawyer, clerk, by J. F. O'Beirne, deputy clerk. Sawyer, circuit judge, concurring specially.

Opinion of Hon. Lorenzo Sawyer.

Upon a careful consideration of the case of Seymour vs. Osborne, I am satisfied that the Supreme Court intended to lay down the rule
224 broadly that on application for the reissue of a patent the Commissioner, in ascertaining the invention intended to be patented, and for which a reissue may be granted, has no authority to look beyond the patent as originally granted with the specifications and drawings thereto annexed, and the models deposited in the Patent Office, "except in certain special cases as provided in a recent enactment," referred to and cited by the court, viz, 16 Stat. at Large, 206. (11 Wal., 544–5.)

The enactment referred to is found in the last clause of section 53 of the act of 1870, and is in the following words: "But when there is neither model nor drawings, amendments may be made upon proof satisfactory to the Commissioner that such new matter or amendment was a part of the original invention, and was omitted from the specification by inadvertence, accident, or mistake, as aforesaid." This is the only exception the court recognizes to the rule as broadly and specifically stated, and repeated in different forms in the course of the opinion; and the exception is referred to "as provided by a recent enactment"; that is to say, the exception depends upon that provision of the statute. The provision was not in the act of 1836. As the exception is held
225 to depend upon this enactment, it, of course, did not exist under the act of 1836; and under that act there was, in the opinion of the Supreme Court, no exception to the rule as laid down by that tribunal.

The original patent to Nobel was issued in 1865, under the provisions of the act of 1836, and he could only obtain such rights as were secured to him by that act. On an application for a reissue at any time during the five years intervening between the issue of the original patent and the passage of the act of 1870, under the rule established by the Supreme Court, there being no model, he would have been limited in the reissue to the invention as described, suggested or substantially indicated, or shown in the original patent and the specifications and drawings appended thereto. Beyond this he could not go, and nowhere in the original patent and the specifications and drawings annexed to it is the subject-matter of the reissued patents numbers 4818 and 4819 in any way suggested. These reissues, therefore, could not have legally been made under the act of 1836. The rights of the parties must be determined under the provisions of that act, and the right to patents
226 for these inventions, if it ever existed, lapsed by a failure to perfect it while that act was still in force.

The proceeding for obtaining a reissue since the passage of the act of 1870, so far as form is concerned, must be in accordance with the latter act. But to allow a party under the provision cited to go outside of the evidence recognized under the act of 1836, to establish a right to a reissue of a patent for an invention made and patented under that act.

would be going beyond the mere forms and modes of proceedings, and would be to grant him a new right by restoring a right to a patent, if one ever existed, which had once been lost either by carelessness or design under the laws then in force, and after the public had acquired a right in the subject-matter by several years' unobstructed legal use—the right to an original patent having been lost by lapse of time—and to a reissue by failure to indicate the whole invention in the specifications finally adopted and annexed to the patent first issued. The last clause of section 53 of the act of 1870, so far as granting a new right is concerned, in my judgment, has no retroactive operation, and it can only apply to reissues of patents originally issued since the passage of the act.

227 This is as far as it is necessary to go in this case, and I prefer not to consider or determine the extent of the exceptions made by that provision until a case arises under a patent originally issued under the act of 1870.

On these grounds I concur in the judgment ordered.

McAllisters & Bergin, M. A. Wheaton, John B. Felton, Alfred Rix, and J. F. Cowdery for complainant.

Wilson & Wilson, W. W. Cope, and C. R. Greathouse for defendants.

September 22, 1875.

(Endorsed:) Read in open court Sept'r 22d, 1875. L. S. B. Sawyer, clerk, by J. F. O'Beirne, deputy clerk.

228 *Order granting appeal.*

At a stated term of the circuit court of the United States of America of the ninth judicial circuit, in and for the district of California, held at the court-room in the city of San Francisco, on Tuesday, the 19th day of October, in the year of our Lord one thousand eight hundred and seventy-five.

Present, honorable Lorenzo Sawyer, judge.

THE GIANT POWDER COMPANY
vs.
THE CALIFORNIA POWDER WORKS ET AL.

At this day, on motion of M. A. Wheaton, esq., solicitor for complainant, it is ordered that an appeal from the decision rendered and decree ordered in the above-entitled cause on the 18th day of October, A. D. 1875, of the July term, A. D. 1875, to the Supreme Court of the United States, be, and the same is hereby, allowed, and that a certified copy of the pleadin s, evidence, and proceedings be forthwith transmitted

229 to the Supreme Court of the United States upon the appellant giving a bond in the sum of five hundred dollars.

230 *Bond on appeal.*

In the Supreme Court of the United States of America.

THE GIANT POWDER COMPANY, COMPLAINANT and appellant,
vs.
THE CALIFORNIA POWDER WORKS, JOHN H. BAIRD, N. G. KITTLE, JOHN O. EARL, J. B. HAGGIN, G. P. LAWTON, THOMAS POWNING, WILLIAM WILSON, and JOHN MEERLANDER, respondents and appellees. } No. 1233.

Know all men by these presents that we, Hamilton Smith, junior, and

Eugene T. Cooper, residents and householders in the district of California, are held and firmly bound unto the California Powder Works, its successor or successors, and to John H. Baird, N. G. Kittle, John O. Earl, J. B. Haggin, G. P. Lawton, Thomas Powning, William Wilson, and John Meerlander, in the sum of five hundred dollars, lawful money of the United States of America, to be paid to the said the California Powder Works, its successor or successors, and to the said John H. Baird, N. G. Kittle, John O. Earl, J. B. Haggin, G. P. Lawton, Thomas Powning, William Wilson, and John Meerlander, their and each of
231 their heirs, executors, or administrators. To which payment, well and truly to be made, we bind ourselves and each of us, jointly and severally, and our and each of our heirs, executors, and administrators firmly by these presents. Sealed with our seals. Dated this thirtieth day of October, A. D. 1875.

Whereas the Giant Powder Company has prosecuted an appeal to the Supreme Court of the United States of America to reverse the decree rendered in the suit in the circuit court of the United States of America, district of California, entitled "The Giant Powder Company versus The California Powder Works and others."

Now, therefore, the condition of this obligation is such, that if the above-named, The Giant Powder Company, shall prosecute its said appeal to effect, and answer all costs if it shall fail to make good its plea, then this obligation shall be void, otherwise to remain in full force and virtue.

HAMILTON SMITH, JR. [SEAL.]
EUGENE T. COOPER. [SEAL.]

Signed, sealed, & delivered in presence of—
JOS. F. O'BEIRNE.

232 UNITED STATES OF AMERICA,
District of California:

Hamilton Smith, junior, and Eugene T. Cooper, being duly sworn, each for himself deposes and says that he is a householder in said district, and is worth the sum of five hundred dollars exclusive of property exempt from execution and over and above all his just debts and liabilities.

HAMILTON SMITH, JR.
EUGENE T. COOPER.

Subscribed and sworn to before me this 30th day of October, A. D. 1875.
JOS. F. O'BEIRNE.
Comm'r of U. S. Circuit Court, Dist. of California.

(Endorsed:)

I approve both the form of the within bond and the sufficiency of the sureties thereon.

October 30th, A. D. 1875.

(Signed) LORENZO SAWYER,
U. S. Circuit Judge, Ninth Circuit.

(Endorsed:) Filed Octr. 30th, 1875. L. S. B. Sawyer, clerk, by J. F. O'Beirne, deputy clerk.

233 UNITED STATES OF AMERICA,
District of California, ss:

I, Lorenzo S. B. Sawyer, clerk of the circuit court of the United States for the district of California, in the ninth judicial circuit, do hereby cer-

tify that the foregoing two hundred and thirty-two pages, numbered from 1 to 232, both inclusive, contain a full, true, and correct copy of all the pleadings and proceedings in the cause therein entitled, on appeal to the Supreme Court of the United States of America.

Witness my hand and the seal of said circuit court this 9th day of November, A. D. 1875.

[SEAL.] L. S. B. SAWYER, *Clerk*,
By J. F. O'BEIRNE, *Dep. Clk.*

234 UNITED STATES OF AMERICA, *ss:*

To the California Powder Works, John H. Baird, N. G. Kittle, John O. Earl, J. B. Haggin, G. P. Lawton, Thomas Powning, William Wilson, and John Meerlander, greeting:

You are hereby cited and admonished to be and appear at a Supreme Court of the United States of America, to be held at the city of Washington, in the District of Columbia, on the first Monday of November, A. D. 1875, pursuant to *a* an order granting an appeal made by the circuit court of the United States for the district of California, wherein the Giant Powder Company is appellant and you are appellees, to show cause, if any there be, why the decree in the said order mentioned should not be corrected, and speedy justice should not be done to the parties in that behalf.

Witness the honorable Morrison R. Waite, Chief Justice of the United States Supreme Court, this 30th day of October, A. D. 1875, and of the Independence of the United States the 100th.

[SEAL.] LORENZO SAWYER,
Circuit Judge.

235 Service of the within, by receipt of a copy, admitted this 30th day of October, 1875.

GREATHOUSE & HAGGIN,
Att'ys for Defendants.

(Indorsed:) 1233. United States Supreme Court. The Giant Powder Co. vs. The California Powder Works, &c. Citation. Service and receipt of a copy admitted this 30th day of October, A. D. 1875. C. R. Greathouse, att'y for appellees. Filed Nov'r 1st, 1875. L. S. B. Sawyer, cl'k, by J. F. O'Beirne, dep. cl'k.

(Indorsement on cover:) No. 322. The Giant Powder Company, appellant, vs. The California Powder Works, John H. Baird, N. G. Kittle, John O. Earl, J. B. Haggin, G. P. Lawton, Thomas Powning, William Wilson, and John Meerlander. California C. C. U. S. Filed 3rd December, 1875.

U. S. Supreme Court.

OCTOBER TERM, 1878. NO. 63.

THE GIANT POWDER COMPANY,

Appellant,

vs.

THE CALIFORNIA POWDER WORKS, JOHN H. BAIRD, N. G. KITTLE, JOHN O. EARLE, J. B. HAGGIN, G. P. LAWTON, THOMAS POWNING, WILLIAM WILSON and JOHN MEERLANDER.

BRIEF FOR APPELLANT.

WM. BAKEWELL,
M. A. WHEATON,
For Appellant.

New York:
John Polhemus, Printer, 102 Nassau Street.
1878.

Supreme Court of the U. S.

No. 63.

THE GIANT POWDER COMPANY,
Appellant,

vs.

THE CALIFORNIA POWDER WORKS, JOHN H. BAIRD, N. G. KITTLE, JOHN O. EARLE, J. B. HAGGIN, G. P. LAWTON, THOMAS POWNING, WILLIAM WILSON and JOHN MEERLANDER.

Appeal from the Circuit Court of the United States, Ninth Circuit, District of California—Appellant's Brief.

STATEMENT OF THE CASE.

This is an action in equity. The bill of complaint was filed May 1st, 1874, and a subpœna was duly issued and served on the defendants.

August 18th, 1874, the defendants filed a demurrer to the bill, and on the 5th day of October, 1875, complainant's solicitor confessed the demurrer and obtained leave to file an amended bill of complaint.

On the 25th day of January, 1875, the complainants duly filed an amended bill of complaint, serving a copy upon the defendants' solicitors, Messrs. Greathouse & Haggin.

February 18th, 1875, defendants' solicitors filed exceptions to the bill of complaint.

On the 14th day of May, 1875, said exceptions were overruled.

The bill of complaint charged the infringement of three certain reissued Letters Patent, and made profert of two original and several reissued Letters Patent, flowing from those two originals, including the three reissues sued upon.

On the 3d day of August, 1874, the Court, upon

the application of defendants' solicitors, ordered that copies of all said original and reissued Letters Patent, of which the bill made profert, be filed as parts of the complainant's bill of complaint, and said copies were filed accordingly.

On the fifth day of June, 1875, the defendants filed a demurrer to the amended bill of complaint. This demurrer was argued and submitted to the Court, and on the 22d day of September, 1875, the Court sustained the demurrer, with leave to complainants to amend their bill of complaint on or before the next rule day.

The complainants declined to amend their bill of complaint, and on the 18th day of October, 1875, a final decree was entered dismissing the complainants' bill.

An appeal from the decision and decree was granted on the 19th day of October, 1875, and an approved bond on appeal was duly filed October 30th, 1875, and a citation was duly served upon defendants' solicitors, October 30th, 1875.

The only questions on this appeal are, 1st, Whether or not the Circuit Court erred in sustaining the demurrer to the said amended bill of complaint; and, 2d, If the order sustaining the demurrer was correct, should not the decree of dismissal have been without prejudice against the bringing of a new suit on reissued Letters Patent, No. 5799?

The amended Bill of Complaint is in the printed record from page 10 to page 16, exclusive of the exhibits, which make a part of the bill. Those exhibits are:

1. Exhibit A, printed record, folios 48 to the end of folio 56.

2. Original Letters Patent, No. 50,617, to Alfred Nobel, folio 84 to end of folio 91.

3. Original Letters Patent, No. 78,317, to Julius Bandman, as assignee of Nobel, folios 92 to end of folio 101. (The printed record erroneously calls this "Reissued," at folio 72.)

4. Reissued Letters Patent, No. 3,377, to the U. S. Blasting Oil Company, assignees of Nobel, folios 102 to end of folio 118.

5. Reissued Letters Patent, No. 3,378, to the U. S. Blasting Oil Company, as assignees of Nobel, folios 119 to end of folio 137.

6. Reissued Letters Patent, No. 3,379, to U. S. Blasting Oil Company, assignees of Nobel, folios 138 to end of folio 155.

7. Reissued Letters Patent No. 3,380, to the U. S. Blasting Oil Company, assignees of Nobel, folio 156 to end of folio 172.

8. Reissued Letters Patent No. 4,818, to the U. S. Blasting Oil Company, assignees of Nobel, folio 173 to end of folio 181.

9. Reissued Letters Patent No. 4,819, to the U. S. Blasting Oil Company, assignee of Nobel, folio 182 to end of folio 188.

10. Reissued Letters Patent No. 5,619, to the Giant Powder Company, assignee by *mesne* conveyances of Nobel, folio 189 to end of folio 200.

11. Reissued Letters Patent No. 5,799, to the Giant Powder Company, assignee by *mesne* conveyances of Nobel, folio 201 to end of folio 211.

Briefly stated, the amended bill of complaint alleges that Alfred Nobel, of Hamburg, Germany, was the first inventor and discoverer of a new process for manufacturing nitro glycerine, also of a new explosive compound made by mixing nitro-glycerine with gunpowder; also forming new explosive compounds by mixing nitro-glycerine with gun cotton and nitro-glycerine with rocket powder; also exploding nitro-glycerine by detonation; also the application and use of percussion caps and other exploders to produce the necessary detonation for exploding nitro-glycerine.

That said Nobel, on the 16th day of September, 1865, filed his application in the U. S. Patent Office

for a patent for his inventions in the manufacture and use of nitro-glycerine.

That with said application he filed a power of attorney appointing Henry Howson his attorney and agent to alter and modify the specifications and drawings in his said application, to receive the patent, &c. That with said application Nobel filed his specifications and drawings, of which Exhibit A in the complaint is a copy.

That on the same day his attorney, Howson, filed amendments to Nobel's specifications in the Patent Office, which amendments were made by striking out a part of the specifications already filed by Nobel, and the patent was granted with the specifications as amended. This is the original patent, No. 50,617, found at folios 84 to 91, inclusive, in the printed record.

The bill avers an assignment of this patent to the U. S. Blasting Oil Company, July 27th, 1866, and *a reissue* to the said Company *of the patent in four divisions;* the same being Reissue 3,377, division A, for the exploding by detonation; Reissue 3,378, division B, for the application of exploders to produce the detonation; Reissue 3,379 for the improved mode of manufacturing nitro-glycerine.

The above three divisional reissues, are not sued upon, and nothing further is said about them in the bill. They are named so far only as explanatory of the original invention and patent, and the other divisional reissue.

The fourth of said divisional reissues, is *Reissue No. 3,380, division D, and was for* "The application and use of nitro-glycerine simple *or compounded* as an explosive for blasting or for disrupting purposes in the manner and substantially as hereinbefore described."

This last patent Reissue 3,380, division D, was again reissued, March 19th, 1872, in two sub-divisions, the same being Reissue 4,818, division D, for the mixtures of gunpowder with nitro-glycerine, and also of gun cotton with nitro-glycerine, and Reissue

4,419, division E, for the mixture of nitro-glycerine with rocket powder.

That on April 12th, 1873, the U. S. Blasting Oil Company assigned the last said two Reissues 4,818, division D, and 4,819, division E, to The Atlantic Giant Powder Company, a corporation, which last Company, on the 15th day of April, 1874, conveyed the same to the plaintiff, the Giant Powder Company. These are two of the patents sued upon, and it was upon the question of their validity that the demurrer was decided in the circuit court.

There is also another original Patent, No. 78,317, set up in the bill, beginning at the middle of folio 37. This patent was for "dynamite" or giant powder, another of Nobel's inventions in the use of nitro-glycerine. The patent issued to Julius Bandman, as assignee of Nobel, and was assigned by him to complainants.

This patent was reissued in 1873, and was Reissue No. 5,619, and this was again reissued March 17th, 1874, and is reissue No. 5,799, one of the reissues sued upon. I understand that no objections are made to the bill on account of form or its not being properly framed. In these respects I believe it is admitted to be without fault.

Neither is any question raised against the last original patent mentioned, No. 78,317, nor to either of its Reissues Nos. 5,619 and 5,799, as we understand the defendants' argument in the Circuit Court.

The propriety of joining the last said reissue No. 5,799 in the same bill with the other patents was alone questioned.

This action is therefore based upon the three reissues, viz: Nos. 4,818, Division D, and 4,819 Division E, the second reissues from Nobel's first patent; and No. 5,799, the second reissue of the second patent, all being according to the bill, for explosive compounds, all of which were invented by Nobel, *and all of which contain nitro-glycerine as a constituent part.* They were all for discoveries and inventions made for utilizing nitro-glycerine as an explosive.

Assignment of Errors.

I.—The court erred in sustaining the demurrer to complainant's amended bill of complaint:

1st. Because the alleged new matter in re-issue No. 4,818 and 4,819 was not new matter, but was contained in the original application for patent.

2d. Because the facts set up in the amended bill, and admitted by the demurrer to be true, sufficiently establish complainant's equity.

3d. Because a part of the bill being admitted by the court to be good, and entitling complainant to the relief prayed for, the demurrer to the whole bill could not be sustained.

II.—The court erred in making a final decree dismissing complainant's bill:

1st. Because as to the validity of one of the re-issued patents (No. 5,799) sued upon, no question was made, as appears by the opinion of the court.

2d. Because, as appears by the opinion of the court, a good cause of suit remained as to one of the patents sued upon, notwithstanding the sustaining of the demurrer as to the other patents included in the suit.

3d. Because none of the patents sued upon are shewn to be invalid by anything appearing in the bill of complainant.

III.—The court erred in not making the decree of dismissal without prejudice to the complainant's right to bring a new suit against the same parties upon re-issued letters-patent No. 5,799.

IV.—The decree of the court was erroneous in not saving the right of complainant to bring a new suit against same defendants on re-issue No. 5,799.

V.—The court erred in deciding that no new matter could be introduced into the specification of a re-issue, except in case of machine patents.

VI.—The court erred in deciding that no new matter could be introduced into the specifications of re-issues No. 4,818 and 4,819.

VII.—The court erred in deciding that the letters-patent re-issues No. 4,818 and 4,819 were invalid because their respective subject-matters were not described in the intermediate re-issue.

VIII.—The court erred in passing on the validity of re-issues 4,818 and 4,819 in demurrer to the amended bill:

1st. Because the demurrer admitted that these re-issues were for the same subject-matter as the original.

2d. Because those re-issues were of that class which admit of evidence of their validity outside of the original patent.

Argument.

In Exhibit A, Nobel shows that the peculiar property which distinguishes nitro-glycerine from other explosives that were in practical use, was that nitro-glycerine would burn until consumed without exploding when fire was applied to it, while "other explosive substances heretofore used always explode when fire is put to them." The nitro-glycerine, though long known, had not been "applied as yet to technical purposes, in consequence of practical difficulties in promoting their explosion." That a chief point in his "invention consists in overcoming this difficulty." He then describes two methods of practicing his invention, *i. e.*, for promoting the explosion of nitro-glycerine. The first method is "by mixing it with gunpowder, gun cotton, or any other substance developing a rapid heat." The second method is, in substance, by a detonation, and is not involved in this action.

In this Exhibit A, Nobel said:

"In consideration therefore,

"1. That nitro-glycerine and analogous substances to which fire can be applied without causing their explosion are known for many years *without having been applied to any practical use, in consequence of practical difficulties in promoting their explosion.*

"That they can be fired without exploding, therein differing from all other explosive substances hitherto used." * * * * * *

"That I have introduced these substances *from the domain of science into that of practical life*, etc."

The above shows what the scope and results of Nobel's discovery and inventions were, viz.: He had discovered how to explode nitro-glycerine, and he had invented the means by which his discovery was reduced to practical use.

It was one of those radical discoveries and inventions that supplies the world's wants by introducing and subjecting to its use an entirely new and needed subject matter. What Morse did for the magnetic telegraph, Fulton for steamboats, and Goodyear for vulcanized rubber, Nobel did for nitro-glycerine and the explosive compounds of which it forms a part. He reduced them from theoretical science to practical use.

In Exhibit A, page 18 of the bill, Nobel claims as his *invention*—

"1. The use of *gunpowder, or similar substances, when mixed with nitro-glycerine*, or analogous substances.

"2. The reduction of the quickness of gunpowder when mixed with *oily explosive*, or non-explosive *substances*.

* * * * * *

"4. The exclusive use of nitro-glycerine and the substances described above, or mixtures of such, as far as their application may be classed under any of the methods indicated in this memorandum."

It matters not how much of what is developed in Nobel's specifications resulted from "discovery," or how much from his "invention." A discovery of any of those matters which are the subjects of patents stands upon the same footing as inventions.

The Constitution of the United States, Art. 1, Sec. 8, provides:

"The Congress shall have power * * * to promote the progress of science and useful arts by securing for limited times to authors *and inventors the exclusive right to their* respective writings and *discoveries*."

The patent law of 1836 (and it is almost identical in language now) reads as follows, viz:

"That any person or persons, having *discovered* or invented any new or useful art, machine, manufacture, or composition of matter," etc. [Sec.

6, Act of 1836] It is for the things above mentioned that patents can be obtained.

From the foregoing it is easy to tell the length, breadth and depth of what Nobel was entitled to a patent for, when he filed his application in 1865. It is all in a nutshell. He discovered how to explode nitro-glycerine, and invented and applied the means for making his discovery practical. He discovered that he could explode nitro-glycerine by causing a detonation in its vicinity or in contact with it, and he obtained the necessary detonation by exploding, by fire, gunpowder, or other known similar explosive in the vicinity of or mixed with the nitro-glycerine. All of this was the subject of a patent, and all of this is "the thing patented," although in separate and distinct parts, by all of the reissues flowing from Nobel's first application, two of which reissues are a part of the basis of this suit.

Up to this time it should be noticed that nothing was said by Nobel about nitro-glycerine being dangerous to handle or transport. The fact of its being dangerous in these respects was not then known. It had been considered a useless substance; had not been manufactured in quantities; had not yet got into any extended use; and its peculiarly dangerous qualities had not yet been discovered. Upon his having discovered how to explode nitro-glycerine it at once became an article of commerce, and several fearful and disastrous accidental explosions followed —one at the Isthmus of Darien and another at Wells, Fargo & Co.'s express office in San Francisco. These explosions are not mentioned in the bill, but are well known in modern history. This dangerous character of nitro-glycerine made it necessary that means should be invented for overcoming it without destroying the efficacy of nitro-glycerine as an explosive of most tremendous power. To this task Nobel successfully addressed himself, and the third reissued patent, No. 5799, explains how and covers the means which he invented, and by which he succeeded. In this patent he says: "This invention

relates to a new and useful combination or mixture of nitro-glycerine with some absorbent substance, whereby the condition of the nitro-glycerine is so modified as to render the resulting explosive compound more practically useful and effective as an explosive, and *far more safe* and convenient for handling, storage and transportation than nitro-glycerine in its ordinary condition as a liquid. * * * *The liability of fluid nitro-glycerine to accidental explosion from agitation or concussion renders its handling and transportation very dangerous. This danger is, however, almost entirely obviated by the use of the compound described by this specification*, because when mixed with a suitable absorbent, the nitro-glycerine is far less sensitive to shocks than when in a liquid condition, so that it may be handled in mass, either loose or in packages, with impunity."

I have thus called attention to the subject of these patents to show the plain distinction between Nobel's two different inventions, as well as to show to some extent the radical nature and great practical value of each. It is evident that Nobel accomplished these great results by the application of untiring industry and superior intelligence and at the constant risk of his life. "Handling edged tools in the dark," was an act of prudence and entire safety as compared with Nobel's experiments with nitro-glycerine while feeling its temper and learning what particular touch would provoke its terrible explosion.

Although most of the grounds of the demurrer were not urged by defendants in the Court below, it is perhaps safer to notice them all briefly in this argument.

The demurrer contains fourteen subdivisions or grounds of objection to the Bill. The first four of these grounds are to the effect that the Bill has not made such a case as entitles the plaintiff to any discovery from the defendants or any relief against them as to the matters contained in the

Bill. And this objection is specifically and separately urged against the Bill as to the matters therein stated respecting each one of the patents sued upon.

The Bill in this case is not one of discovery. A bill of discovery is a bill filed for a discovery which is to aid some other suit pending. The fact that interrogations are asked does not make it a bill of discovery. Interrogations are usual and proper in bills of complaint in equity suits, which bills are not bills of discovery. Such interrogatories are proper in equity patent suits, and the bill in this case is proper in form and substance, and does state a cause of action as to each and all of said patents.

Story's Equity Pleadings, §§ 35 to 40, also §311 and authorities there cited.
Curtis on Patents, §406.
Forty-first Equity Rule.

The fifth, sixth, seventh, eighth and ninth subdivisions of the demurrer are to the effect that the Bill is multifarious because it is based upon the three patents, Nos. 4818, 4819 and 5799.

In our bill we allege that the defendants "have manufactured, used and sold sundry explosive compounds, each containing and embracing the said inventions, and each of them;" and this allegation having been made in the bill, the bill is not demurrable for multifariousness. Nor was the demurrer sustained on the ground of multifariousness, and the defendants not having taken an appeal, the question of multifariousness does not arise in this Court.

See Bill, folio 42.

The tenth point in the demurrer that the Bill is ambiguous in not stating the terms of the patents, is not well taken, as the terms of the patents are stated (see fols. 33 and 39).

Besides the patents are now a part of the Bill and the terms are stated in them.

The eleventh and twelfth points in the demurrer are in effect that the Bill is ambiguous, etc., because

it does not state what kind of explosive compounds defendants make, or how those compounds can infringe plaintiff's patents.

Our Bill, in this respect, is framed according to precedent and authority. It has never been the practice to describe specifically the acts of the defendants further than to make a general charge of infringement.

Curtis on Patents, §353, says that the declaration may "simply allege that the defendant made, constructed, used and vended to sundry persons," etc., the alleged invention.

See also Case *v.* Redfield, 4 McLean, 526.

The other two points in the demurrer, viz., the thirteenth and fourteenth, are only to the effect that the plaintiff has no right to make interrogatories The references already made to Story's Equity Pleadings, etc., prove the interrogatories proper. If they were improper they should be reached by a motion to strike out, and not by demurrer, as at the most they could only be surplusage. They form no part of the allegations of the Bill, but are merely a part of its prayer.

This disposes formally of each of the grounds of demurrer, but under the specifications in the demurrer to the effect that the Bill does not state any cause of action, some points were made in the argument below which require especial notice upon our part.

One of these is, that the Bill shows that Nobel was an alien, and there is no allegation in the Bill that he put and continued his invention on sale to the public, on reasonable terms, within eighteen months from the date of the patent.

The defendants are evidently mistaken in this point. The Bill states (folios 41 and 42):

"And your orator further shows unto your Honors, that *always*, since the said inventions were made, and said Letters Patent issued, the said Alfred Nobel and his assignees, each during the time respectively, that each was the owner thereof, * * * have made, constructed, used and vended to others to be used, the said inventions, and each of them," etc.

Even if the allegations were not in the Bill, it would make no difference; for, by the very terms of the Statute, sec. 15, Act of 1836, it is made a matter purely of defense. The Statute says: "That the *defendant* in any such action shall be permitted to plead the general issue, and to give this act, and any special matter in evidence, of which notice in writing may have been given to the plaintiff or his attorney thirty days before the trial, tending to prove that the specification filed by the plaintiff, does not contain the whole truth, * * * or that the patentee, if an alien at the time the patent was granted, had failed and neglected, for the space of eighteen months from the date of the patent, to put and continue on sale to the public, on reasonable terms, the invention or discovery," etc.

Thus this is not only a matter of defense, but a defense which the defendant cannot avail himself of unless he first gives the plaintiff thirty days' notice of his intention to prove it.

Another point that the Bill does not contain any confederation clause. The confederation clause is excused by the twenty-first equity rule.

The objection is urged that the patent for mixing nitro-glycerine and rocket powder does not state the proportion in which they should be mixed. This patent does state that the proportions *may be varied* to suit the pleasure or convenience of the user or manufacturer. This is equivalent to saying that any proportions will accomplish the desired result, and this is all the patent law required. (Sec. 6, Act of 1836, Sec. 26, Act of 1870.) The Court cannot say, as matter of law, that the description is insufficient.

In the case of Tyler *v.* Boston, cited by defendants, in the Court below, the question was decided as one of fact and not of law.

A mixture, formed with any amount of nitro-glycerine from this maximum quantity down to the

infinitesimal, will, according to the patent, explode by the application of fire, and this is the whole result attained by the invention covered by that patent.

Curtis on Patents, §35.
Neilson *v.* Harford, Webster's Patent Cases, 295, 366, quoted in Curtis, pages 235, 236 and 237, is strongly applicable.
Curtis, § 246, 247, 253 and 255.

The other point is the one dwelt upon at great length, viz., that the reissues, 4818 and 4819, are invalid because their subject matter, although described in the original specification filed, were not described in those specifications as they were amended and attached to the original patent, No. 50,617.

The patent law allowed, and still allows, the original patent to be for the *whole* discovery or invention made, and provided, that before receiving the patent the inventor should file a description of his invention in the Patent Office, and should make oath, &c.

Sec. 6, Act of 1836. Sec. 5 on the same page requires that every patent, with the specifications and drawings, shall be recorded, etc., and further, provides, that the patent shall contain a short description or title of the invention or discovery, referring to the specifications for the particulars thereof, and that a copy of the specification shall be attached to the patent.

The quotations which I have already made from Nobel's original specifications, filed with his original application for a patent, plainly describe the mixture of nitro-glycerine with gunpowder and similar explosives.

(See last half of folio 32 and first three lines in folio 33 of printed record.)

I have purposely left out what Nobel says of the nitro-glycerine being exploded by the high degree of heat produced by detonation, pressure, the blow of a hammer, &c., for the reason that those parts merely undertake to

furnish a *rationale* of the hidden operations of nature, and may or may not have been correct. He discovered that the detonation produced the explosion, and that was enough. Neither he nor any other man can ever tell why or how the detonation operates to produce the explosion, any more than they can tell why or how the application of fire explodes gunpowder. They know that in both cases the substances are suddenly and violently changed into gases filling a very greatly increased space, and there knowledge stops. Why or how this change takes place is as much beyond human knowledge as is the "why" and "how" of the burning of fire or growing of grass.

It was neither requisite nor proper for Nobel to undertake to explain any part of the *rationale* or reasons why the detonation, &c., produced the explosion. It was enough that he described the physical means necessary to produce the physical effect in terms sufficiently certain to enable the world to use the discoveries and inventions.

In Curtis on Patents, in Section 32, he says:

"The law does not look to the mental process by which the invention has been reached, *but to the character of the result.*"

And in Section 36 *ibid*, he says:

"It is obvious *that the result* in such cases *furnishes a complete test of the sufficiency of the invention.*"

In Many *v.* Sizer, 1 Fisher, 28, the Court says: "From our inability to penetrate the secrets of nature we may not be able to detect the new principle or power *otherwise than by its effect.*"

In Woodward *v.* Dinsmore, 4 Fisher, 166, the Court says: "I am by no means sure that the complainant was himself aware of the *rationale* of his own invention, when he took out his patent in 1857. He did what never seems to have been done before: he made a great improvement, the value of which was at once recognized by the photographic world. But whether he was able in his original specification to give the *rationale* of his invention or not *he nevertheless gave the invention itself to the*

public. He was the first and original inventor in the eye of the law and was entitled to a patent."

Piper *v.* Brown, 4 Fisher, 182, sets forth this point in a very strong light.

After Nobel filed his said original specifications and power of attorney, Howson, the attorney, filed amended specifications, *leaving out all of Nobel's statements and claims as to the mixture and use of the said compounds*, viz: "gunpowder or similar substances when mixed with nitro-glycerine;" *and the patent issued with the specifications so amended.* (See allegations in the amended bill, at folio 33; also specifications to the patent as issued, folios 86 to 91.)

The claim in the first subdivisional reissue, No. 3,380 is for "the application and use of nitro-glycerine, simple *or compounded*, as an explosive for blasting or for disrupting purposes, in the manner and substantially as hereinbefore described." The above words, "or compounded," is all there is in the specifications of reissue 3,380 that could include or refer to the mixtures of nitro-glycerine with gunpowder or similar substances. The claim is at folio 172. The title of the invention as mentioned in the patent—folios 157 and 158—is broad enough to include the mixtures.

The two subdivisional reissues of 3,380 viz. resissue 4,818 and 4,819, plainly describe and claim those mixtures which, under the description of "gunpowder or similar substances when mixed with nitro-glycerine," and other similar terms were described and claimed *in the original specification filed* by Nobel, but which were not described or claimed in the specifications which issued with the patent.

The vital question in this case is, *Did the Commissioner, when granting the reissues, have the right to look into Nobel's original specification on file, for the purpose of ascertaining what those inventions were, or was he confined to the amended specification which issued with the patent?*

The Circuit Court decided that the Commissioner could only look to the amended specifications which issued with the patent, and *could not look to the original ones filed*

by Nobel. For this reason they decided the said reissues, Nos. 4,818 and 4,819, to be void, and sustained the demurrer. (See opinions of Mr. Justice Field and Hon. Lorenzo Sawyer, Circuit Judge, in the printed record, folios 214 to 227.)

If, therefore, the Commissioner had a right to look at Nobel's original specifications to see what his inventions were, then the decree appealed from must be reversed.

This exact point, so far as I know, has never been decided except in this case. But we think that, both according to authority and reason, the Commissioner had the right, and was bound in duty, to look as well to the original specification on file as to the amended ones which issued with the patent.

Reissue No. 3,380, Division D, was granted April 13th, 1869, and of course its validity depends upon the law then in force which was the patent law of 1836. So far as applicable to this point there is very little difference in the language and none, I believe, in their actual provisions, between the law of 1836 and the law of 1870 under which the reissues 4818 and 4819 were granted.

Section thirteen of the law of 1836 provides "That when any patent which has heretofore been granted or which shall hereafter be granted, shall be inoperative or invalid * * * it shall be lawful for the commissioner * * to cause a new patent to be issued to the said inventor *for the same invention* for the residue of the period then unexpired for which the original patent was granted in accordance with the patentee's corrected description and specification. * * *And the patent so reissued together with the corrected description and specification shall have the same effect and operation in law on the trial of all actions hereafter commenced for causes subsequently accruing as though the same had been* ORIGINALLY FILED *in such corrected form* BEFORE THE ISSUING OUT OF THE ORIGINAL PATENT," &c.

Most of the adjudications applicable to this point were adjudications upon reissues granted under the law of 1836, and hence it is proper to apply the adjudications to that law, and that law to them on this argument. The phraseology of the law of 1870 is slightly changed, but I believe it means exactly the same as the law of

1836, so far as the questions arising under this point reach. See section fifty-three of law of 1870.

What is meant in said section thirteen by the term "same invention" for which the reissued patent may be granted? Obviously it means the invention which has already been mentioned somewhere. It certainly does not mean an invention which had not yet been mentioned in the enactment. Now what invention had been mentioned in the preceding sections to which the expression "same invention" could apply? There was one, and only one, and that was the *whole invention* of which the patentee was the first and original inventor or discoverer. In what place in the law up to section thirteen is any other or less invention mentioned than such whole, entire invention of the patentee to which the expression could refer. it cannot be found. It is not there. The law up to section thirteen did not but once mention the "patented invention" nor the "invention as patented," nor use any similar expression in which the invention limited or curtailed by the patent can be found mentioned or included except once, in section two, where it forbids the Commissioner and employees of the Patent Office from being interested "directly or indirectly in any patent for an invention or discovery which has been or may hereafter be granted." This particular clause is the only one that mentions an invention limited by the patent, and this clause has no connection with the provision for reissuing patents. The law speaks of an invention for which a patent may or shall be granted, but it nowhere spoke, except in section two, of an invention which had been patented, unless in section twelve, where it provides for filing a caveat by one party and then speaks of an application which might be made by some other party for a patent for "any invention" which might interfere, &c., and with the two said exceptions there is no invention mentioned or referred to in the whole patent law of 1836, prior to the words "same invention" in section thirteen, other or less than the whole invention or discovery made by the inventor. The law did not in terms provide for issuing a patent for any invention less than the whole of the invention or discovery which the inventor made, and of which he was the first and original

discoverer or inventor. The said two exceptions had no connection with the provisions for reissue, and could not have been referred to in the expression "same invention."

Let us examine the law closely for its use of the expression "invention" up to said section thirteen.

Prior to the expression "same invention," in section thirteen of the law of 1836 the word "invention" or "inventions" occurs just twenty-four times, and in the following connections, viz., section one establishes the Patent Office and provides that the duty of the Commissioner shall be "to superintend, execute and perform all "such acts and things touching and respecting the grant-"ing and issuing of patents for new and useful dis-"coveries, *inventions* and improvements as are herein "provided for," etc.

Section two provides that the Commissioner may appoint an inferior officer and clerks, and prescribes duties to them and says, "And said Commissioner, clerks and "every other person appointed and employed in said "office shall be disqualified and interdicted from acquir-"ing or taking, except by inheritance during the period "for which they shall hold their appointments, respec-"tively any right or interest directly or indirectly in any "patent for an *invention* or discovery which has been or "may hereafter be granted."

Neither section three nor four contains the word invention at all.

Section five provides how patents shall be executed, and says, "Every such patent shall contain a short de-"scription or title of the *invention* or discovery correctly "indicating its nature and design, and in its terms grant "to the applicant or applicants, his or their heirs, ad-"ministrators or assigns, for a term not exceeding four-"teen years, the full and exclusive right and liberty of "making, using, and vending to others to be used the "said *invention* or discovery, referring to the specifica-"tions for the particulars thereof, a copy of which shall "be annexed to the patent specifying what the patentee "claims as his *invention* or discovery."

Section six provides that "any person or persons "having invented any new and useful art * * not known "or used by others before his or their discovery or *in-* "*rention* thereof * * and shall desire to obtain an exclu- "sive property therein * * the Commissioner on due pro- "ceedings had may grant a patent therefor. But "before any inventor shall receive a patent for any "such new *invention* or discovery he shall deliver a "written description of his *invention* or discovery * "* * and in case of any machine he shall fully ex- "plain the principle and the several modes in which he "has contemplated the application of that principle or "character by which it may be distinguished from other "*inventions* and shall particularly specify and point out "the part improvement or combination which he claims "as his own *invention* or discovery. He shall further- "more accompany the whole with * * specimens of "ingredients * * where the *invention* or discovery "is of a composition of matter. * * And he shall "moreover furnish a model of his *invention* in all cases "which admit of a representation by model," &c.

Section seven provides that "on the filing of any such "application * * the commissioner shall make or "cause to be made an examination of the alleged new "*invention* or discovery; and if on any such examina- "tion it shall not appear to the commissioner that the "same had been invented or discovered by any other "person in this country, prior to the alleged *invention* "or discovery thereof by the applicant, * * it shall "be his duty to issue a patent therefor. But whenever "on such examination it shall appear to the commis- "sioner that the applicant was not the original and first "inventor or discoverer thereof, or that any part of that "which is claimed as new had before been invented, * "* he shall notify the applicant thereof, giving him "briefly such information and references as may be "useful in judging of the propriety of renewing his "application or of altering his specification to embrace "only that part of the *invention* or discovery which is "new. * * * But if the applicant shall persist in "his claims for a patent * * * he may, on appeal, "and upon request in writing, have the decision of a

"board of examiners, * * one of whom, at least, to "be selected, if practicable and convenient, for his "knowledge and skill in the particular art, manufacture, "or branch of science to which the alleged *invention* "appertains; * * said board shall be furnished with "a certificate in writing of the opinion and decison of "the commissioner, stating the particular grounds of his "objection and the part or parts of the *invention* which "he considers as not entitled to be patented."

Section eight provides for notice of interference, and says:

"If either party shall be dissatisfied with the decision "of the commissioner on the question of priority of right "or *invention* on a hearing thereof, he may appeal," &c.; and further says:

"But nothing in this act contained, shall be construed "to deprive an original and true inventor of the right to "a patent for his *invention* by reason of his having pre-"viously taken letters patent therefor in a foreign coun-"try," &c.

Section nine does not mention "invention" at all.

Section ten provides for the issue of the patent when an inventor dies; it says:

"That where any person hath made or shall have made "any new *invention*, discovery or improvement, on ac-"count of which a patent might by virtue of this act be "granted, and such person shall die before any patent "shall be granted therefor," &c.

Section eleven does not use the term "invention" at all.

Section twelve provides for filing caveats. It provides that any citizen or alien under certain conditions, "who "shall have invented any new art machine or improve-"ment thereof, and shall desire further time to mature "the same may * * file in the Patent Office a caveat "* * praying protection of his right till he shall have "matured his *invention*; which sum of twenty dollars, "in case the person filing such caveat shall afterwards "take out a patent for the *invention* therein mentioned. "* * And if application shall be made by any other

"person within one year from the time of filing such "caveat for a patent of any *invention*, with which it may "in any respect interfere," &c.

Near the beginning of section thirteen it speaks of the patent being inoperative, &c., "by reason of the patentee "claiming in his specification as his *own invention* more "than he had or shall have a right to claim as new."

The above quotations include every mention made of the word "invention" in the patent law of 1836, up to the place in section thirteen, where it says that under certain conditions reissued Letters Patent may be granted "*for the same invention.*" It seems too plain for argument that the law means by the *same* invention the invention it has been all along talking about. That when it says the party may take out *new* Letters Patent for the "same invention," it means *his* same invention for which he might have taken out *his* first patent under the law. *His* invention *is nowhere mentioned in the law prior to section thirteen as being patented or limited by a patent.* It is all the while spoken of as his whole invention so far as he was the original and first inventor, and nothing less in any place. There is a wide difference between speaking of his whole invention and saying he *may have* a patent for his whole invention, and speaking of his invention for which he *has* received a patent; and when the law has all the while spoken of his whole invention and said he might have a patent for his whole invention but has not once mentioned any invention already patented to him, it must mean by "*same* invention" the only invention to which it can refer, the only invention it has mentioned in any connection with the patentee, and that is the whole invention made by him of which he was the first and original inventor.

Some effect must be given to the above quoted provision from section thirteen that "the patent reissued, to- "gether with the corrected description and specification "shall have the same effect and operation in law on the "trial of all actions hereafter commenced for causes sub- "sequently accruing *as though the same had been orig- "inally filed in such corrected form before the issuing "out of the original patent.*"

Why does the law thus give effect to the "*corrected description and specification*" as though they had been *originally filed* that way unless it means it? The patent itself is never filed. It is issued and recorded, but not filed. Only the specifications, drawings and models are filed. Why does the law thus declare an effect to the reissued patent derived from an *original filing* of the specification *before the patent issued* if it really means to limit the reissue to such specifications after they were changed and issued with the patent, either by "inadvertency, accident or mistake?" Instead of such being the case the very object of the law was to cure such inadvertency, accident or mistake. In this very case the bill fairly shows that the mistake was made by the attorney Howson, who could not in the nature of things understand the full scope of the invention as well as Nobel, who was in Europe and could not have known of the change. He sent and filed specifications ready drawn and verified, and thus took precautionary steps against mistakes, the only ones he could take. It would be strange if he should lose his invention by such a mistake made by his attorney.

The case of Grant *v.* Raymond (6 Peters, 220), goes almost, if not quite, far enough to compel, in such a case, a grant of a new patent even in the absence of all Statute providing for it.

Plain as the law itself seems to be, our opponents contend that the Courts have decided that on an application for reissue under the law of 1836, the commissioner cannot look behind the patent that issued or to the model in the Patent Office to see what the invention was. His Honor Judge Sawyer, held himself bound by the decision in Seymour *v.* Osborn, 11 Wallace, which he construed as so deciding, (see his opinion, printed record, page 72).

The claim thus made by the defendants as to what has been adjudicated does not necessarily assert that the reissued patent is not authorized to be for the whole invention made, but is rather an assertion that what the whole invention was which the patentee made, can only be proved by the original patent or model. That *other records cannot be used* as such proof even though the other record be the original specifications filed, but which were amended before the patent issued.

We deny that the Courts have ever so decided, or have ever so intended to decide.

The law of 1836 did not say what should be used as evidence to prove the original invention on an application for a reissue.

Let us see what interpretation has been put on the Statute by the Patent Office.

The rule of practice of the department under the Act of 1836, was as follows:

"Whatever is really embraced in the original invention and *so described or shown that it might have been embraced in* the original patent, may be the subject of a reissue, but the applicant will not be allowed the benefit of proof that there was more in his invention than is shown in the *original application*, model or specimens." Rule 53, Practice of Patent Office.

Thus we see that the Patent Office regarded the *original application* as admissible evidence of what the patentee might claim as his invention on reissue of his patent.

So in *ex parte Ball*, it was held by Judge Morell, that "on application for a reissue the original model "may be referred to as evidence of the extent of the "true invention, and the patentee is not confined to the "*original record*."

Judge Dunlap, in *ex parte Dyson*, held that "what the "Legislature designed to secure to patentees by the 13th "section of the Act of 1836, was to enable them to cure "honest mistakes and to get substantial protection for the "same invention they had made and *intended to be* "*patented*, when the original patent was granted. The "Legislature has not said by what proof the applicant "shall show that his invention claimed on reissue is the "same invention made and *intended to be patented* in "his original application. It (§ 13), requires that the "invention sought to be introduced into the amended "specification, should be the same invention *originally* "*intended to be patented*."

And in *Wilson* v. *Singer* Judge Dunlap held that "A "patentee, on an application for a reissue, may claim all "those devices which were clearly exhibited in his *orig-* "*inal specification*, drawings and model, and which *he*

"*might have legally claimed at the time of taking out* "*his original patent.*"

It will be noticed that the original specification here referred to must mean the specification originally filed by the inventor with his application, and that this, together with the drawings and model also referred to, form the *Patent Office record*, and the best evidence of what the invention sought to be patented actually was.

In *Dyson* v. *Gambrel* Judge Dunlap held that "There "can be embraced in a reissue only what was invented "before or at the time of the grant of the original patent, "what was then invented, and *omitted* to be put in the "original patent by accident or mistake, and without any "fraudulent or deceptive intention, and only such inven- "tion is by law the subject of reissue."

These decisions of Judges of the Circuit Court for the District of Columbia were on appeal from the Patent Office, and regulated the practice of the Office on the questions decided by them.

And such has continued to be the interpretation put on the law of reissue by the Patent Office to the present time.

In the case of C. W. Baldwin's Appeal, 9 Official Gazette, p. 639, the Commissioner of Patents held that a drawing accompanying an application for a patent, as forming part of the original record, although such drawing was not attached to the original patent as issued, was a proper basis for a reissue claiming features shown in such drawing, but not described in the specification of the original patent, and he says: "In any equitable view "of the case, and in my judgment in accordance "with the true spirit and intent of the law, he should "have protection commensurate with the invention *which* "*he originally disclosed to the Office.* If any part of it "was suppressed at the time of the issue of the original "patent, it may now be brought to light and inserted in "the specification, and be made the subject of a claim."

And in the case of Dieckerhoff's Appeal, 12 Off. Gaz., 429, it was decided that the papers on file in the Patent Office forming part of the original application could be referred to on reissue, to ascertain the scope of the original invention. See also Soucie Winslows application 9 Off Gaz 795.

But both the Patent Department and the Courts decided as cases came before them that only the records could be used as proof. These were undoubtedly the best evidence and of course should be the only evidence.

Usually those records were the original specifications, a copy of which issued with the patent, the drawings and the model. The original specifications were usually those that issued with the patent so far as their subject matter went. The consequence was that in the cases adjudicated the terms "original specifications filed" and "specifications that issued with the patent" and "patented inventions," &c., &c., were convertible terms. One was the same as the other and meant the same as the other, and terms were used as convenience, inclination or impulse might suggest, without ever once saying or intending to say that the original specifications first filed and on file could not be looked at and used the same as any other record evidence might be looked at and used. On the contrary, we think the Courts have said that the original specifications might be used to ascertain what the invention was in case of a reissue.

The case of Seymour *v.* Osborne is the one upon which our opponents seem to most rely, 11 Wallace.

In that case there were no amendments of the original specifications filed before the patent issued, and consequently the description in the original specifications and the description in the patent were the same. That the Court mean in that case to assert that the reissue should be as broad as the original invention, is obvious from the following language used on page 544 of the volume:

"Power is unquestionably conferred upon the Commissioner to allow the specification to be amended if the patent is inoperative or invalid, and in that event to issue the patent in proper form; and he may doubtless under that authority allow the patentee to *redescribe the invention*, and to include in the description *and claims of the patent*, not only what was well decribed before, but whatever else was suggested or substantially indicated in the *specification* or drawings which properly *belonged to the invention as actually made and perfected*."

The reissue may cover all that belonged to the origi-

nal invention, as that invention was actually made. As a mere matter of evidence, to show what that invention was, the application for reissue was confined to "the *original* specifications, drawings, or Patent Office model." In the first ten lines, page 545, in Seymour *v.* Osborne, the Court uses the term *original* specification instead of patent. It says:

"Corrections may be made in the description, specification, or claim, where the patentee has claimed as new more than he had a right to claim, or where the description, specification, or claim is defective or insufficient; but he cannot, under such an application, make material additions to the invention which were not described, suggested nor substantially indicated *in the original specifications*, drawings, or the Patent Office model."

As a matter of law and fact, neither the original specifications nor the original drawings, nor the model, ever issue with the patent. The *originals are filed*, copies only are issued.

There are many other cases in which the term *original* specification is used, instead of naming the specification that issues with the patent. We claim that the correct rule is laid down by this Court in the case of Collar Company *v.* Van Dusen, 23 Wallace, pages 557 and 558, in the following language:

"Repeated decisions also have established the rule " that parol testimony is not admissible in an application " for a reissued patent, so as to enlarge the scope and " effect of the invention beyond what was described, " suggested, or substantially indicated in the *original* " *specification*, drawings, or Patent Office model, as the " purpose of a surrender and reissue is not to introduce " new features, ingredients, or devices, *but to render* " *effectual the actual invention for which the original* " *patent should have been granted.*"

Thus, in *Latham* v. *Lorber*, it was held by Nelson and Betts, *J.J.*, in 1847, that a patentee can legally take out a reissued patent for more than he described in the surrendered patent, if it does not exceed the *actual discovery* when the patent was first taken out.

Mirror of Patent Office, p. 146.

In Sarven *v.* Hall, 5 Fisher, the Court, after referring to authorities, takes a condensed view of them, which it expressed in the following language:

"This view of the law renders it necessary to inquire "what invention is disclosed by the ORIGINAL RECORD— "*the original* patent, *specification*, drawings, and model "—and in that inquiry the right of the complainant "must be conceded to supply any defects or insufficien- "cies in the description of anything which is found "therein, in any form.

"In the *original specification* the patentee declares," &c.

In the case of the Chicago Fruit Co. *v.* Busch, 4 Fisher, on page 400, the Court says:

"In considering the validity of a reissued patent, then, "the only question is as to whether the invention de- "scribed in the reissued Letters Patent is to be found in "the *original* model, *specifications*, or drawings *of the* "*inventor*. In other words, is it *his* invention? If it "can be found * * the reissue is granted."

It is to be borne in mind that the *original* specifications are *filed* and remain a permanent record in the Patent Office. The *original* specifications are never issued with the patent. *Only a copy* of the specifications, either original or amended, ever *issues with the patent*.

Section 5, Act of 1836.

The original specifications are, as a matter of course, the *first ones filed*. They are a part of the *original record*.

In Aultman *v.* Holley, 6 Fisher, page 537, the following language is used:

"The claim that the reissued patents on which this "suit is founded are void because they are not for the same "invention as the original, but claim substantial matters "not included in the former, *nor shown, suggested or de-* "*scribed in the* ORIGINAL RECORD, is most urgently "pressed."

In Hoffheins *v.* Brandt, 3 Fisher, on pages 227 and 228, the Court says:

"For, under the true construction of the Patent Act of "1836, a reissue can be obtained only *for that which was* "*the original and true invention of the patentee*, but "which he failed to claim or describe in the *original* "claim and *specification* in such a manner that a person "skilled in the art could from *that specification*," &c.

In Carhart *v.* Austin, 2 Fisher, on page 550, the point was made that the invention covered by the reissued patent did not appear "either in the specification, drawing or model filed and remaining in the Patent Office, as a part of the original application." And on page 553 of the same *the Court places the original application filed on the same footing with the model*, but does not decide whether they can be examined to ascertain the invention or not. It has, however, been repeatedly decided in other cases that a model may be so examined. (See also Commissioner's decision in Aldrick & Evans, 9 O. G., 407.)

In Herman Vogler *v.* Edward Semple, U. S. Circuit Court in Illinois, *Official Gazette*, p. 923, the Court says:

"The general principle involved in all reissues is that "there can be nothing given in the reissue which was not "in the *original specifications* or drawings, although "some minor amendments have been at times allowed in "the original specifications or drawings for the purpose "of more accurate and specific description; that is to say, "the reissue cannot be made to cover anything which "was not *in the original invention*," &c.

To whatever length we extend quotations from the language used by the Courts in deciding what evidence the Commissioner might use in determining what invention the reissued patent might cover, we find it expressed in language, in intention and in reason, that the Commissioner could and should use all of the four elements which constituted the original record of the case up to the time the original patent was delivered to the patentee; and that those four elements consisted of, 1. The original specifications filed when the application for the patent was made. 2. The drawings filed at the same time. 3. The Patent Office model also filed at the same time; and 4. The patent itself, which contains a short description or title of the invention, as provided in section five of the law of 1836 and section 4884 of the

U. S. Revised Statutes. I mean here the patent itself, as distinct from the copy of the specifications which is attached to it. In England the patent issued first, and the specifications were filed afterwards.

The patent is the grant of the exclusive right to manufacture, use and sell the invention. It mentions the invention by its title or by a short description, *comprehensive and indefinite enough to include the whole invention, whether described in the specifications or not.* In this sense the Courts may have correctly said the whole invention was patented, even though defects in the specification made the patent inoperative. When the Courts have said that the reissue could not cover any invention other than the one patented in the original patent, if they do not mean the invention mentioned by name or short description in the patent, they must mean that no invention can be covered by the reissue except what was claimed and protected by the original patent. The language cannot, however, have been used in the latter sense, because the very object of the reissue according to law was to cover and protect *such of the invention as was not protected* by the original patent, and was not covered by it except by name, or by the short description found in the patent itself.

As, for instance, the original patent that was granted to Nobel (see folio 84 and 85) reads as follows, viz.:

"Whereas, Alfred Nobel, of Hamburg, has alleged that he has invented a new and useful improved substitute for gunpowder; * that he does verily believe that he is the original and first inventor or discoverer *of the said invention*, * and presented a petition to the Commissioner signifying a desire of obtaining an exclusive property in *the said invention*. * These are therefore to grant according to law to the said Alfred Nobel, * the full and exclusive right and liberty of making, constructing, using and vending to others to be used, the said invention," &c.

Then follows a statement that a description of the invention is annexed to the patent, which statement was not in fact wholly true; the annexed description contained only a part of Nobel's invention, only a part of what his petition to the Commissioner had prayed for a

patent for. (His petition for a patent, of course, accompanied the original specifications, instead of the amended one.)

Now the invention named in this patent as there named, was Nobel's whole invention; it included his whole invention of substituting nitro-glycerine for gunpowder. It, in its terms, as much covered the mixtures patented in reissues 4818 and 4819, as it did any other part of Nobel's invention. *It was a patent on its face for the invention for which he had presented a petition.* Every part of the invention covered by that petition was, in terms, covered by the patent, and was a part of the "patented invention," notwithstanding that a part of the patent was made inoperative and ineffectual because it afterwards falsely stated that the invention was described in the annexed specifications, when it was only partly described therein.

It is true, that this saying an invention is patented when the patent does not protect it, looks a little like stating an absurdity. But it must be remembered that I am only trying to find what the Courts have meant when they say the reissues could only be for the same invention originally patented, and which invention was not protected by the patents because as to the invention the patent was inoperative. It was the Courts, not I, that have said an invention could be patented and yet not be protected by the patent. I confess that I do not know what it means, but am only assuming what it may mean.

There is still another view to be taken of what is patented by the original patent. It is conceded that for the purposes of a reissue the Commissioner may examine the Patent Office model, and if he discovers the invention in that for which the reissue is asked, he may grant the reissue notwithstanding the invention is not shown in either the specifications or drawings.

In the case of Hoffheins *v.* Brandt, 3, Fisher, on page 229, the Court declares that the *model is a part of the patent.* If the model is a part of the patent, surely the whole record of the application is as much so. The law does not in terms say that the model constituted any art of the patent. If the model is a part of the patent,

it becomes so by being placed upon the public records where the public may see and know what it is. The whole application stands upon the same footing. The petition, the oath, the original and amended specifications and drawings, are all a part of the public records, and thereby become "patent" to the public in the literal sense of the word. The original specifications are as much a part of the patent as the model is.

To return to the case of Seymour *v.* Osborn, 11 Wallace, since that is the case supposed to weigh most heavily against us, and we find in that the same general idea as in the other cases when all weighed together. Beginning on page 544, it says:

"Reissued Letters Patent must by the express words of "the section be *for the same invention*, and consequently "where it appears on a comparison of the two instruments "as matter of law that the reissued patent is not for the "same invention as that *embraced and secured in the* "*original patent*, the reissued patent is invalid, as *that* "*state of facts shows that the Commissioner in grant-* "*ing the new patent exceeded his jurisdiction.*

"Power is unquestionably conferred upon the Com- "missioner to allow the specification to be amended if the "patent is inoperative or invalid, and in that event to "issue the patent in proper form, and he may doubtless "*under that authority allow* the patentee to redescribe "his invention *and to include in the description and* "*claims* of the patent *not only what was well described* "*before* but *whatever else was suggested* or substantially "indicated *in the specification* or drawings *which prop-* "*erly belonged to the invention as actually made and* "*perfected.* Interpolations of new features, ingredients "or devices which were neither described, suggested nor "indicated in the original patent *or Patent Office model* "are not allowed, as it is clear the Commissioner has no "jurisdiction to grant a reissue unless it be for the same "invention as that *embodied* in the original Letters "Patent, which necessarily excludes the right on such an "application to open the case to new parol testimony and "a new hearing as to the nature and extent of the im- "provement, except in certain special cases as provided

" in a recent enactment not applicable to the case before " the Court.

" Corrections may be made in the description, specifi- " cation or claim where the patentee has claimed as new " more than he had a right to claim, or where the de- " scription, specification or claim is defective or insuffi- " cient, but he cannot, under such an application, make " material additions to the invention which were not de- " scribed in the *original specifications*, drawings or " Patent Office model."

* * * * * *

" Whether a reissued patent is for the same invention " as that embodied in the original patent or for a differ- " ent one is a question for the Court, in an equity suit, to " be determined as a matter of construction *on a com-* " *parison of the two instruments*, aided or not by the " testimony of expert witnesses, as it may or may not ap- " pear that one or both may contain technical terms or " terms of art requiring such assistance in ascertaining " the true meaning of the language employed."

The above is a full quotation containing the language which it is claimed is fatal to our case. It is the language which says the original specifications cannot be looked at in granting the reissue, providing they have been amended, according to the claim of the defendants in this case, and according to the opinions of the Court below. If by a fair construction of the foregoing language it holds that the original specifications filed can be looked at by the Commissioner for the purpose of finding an invention for which a reissue may be granted, notwithstanding that such original specifications were amended and a copy of the amended specification issued with the patent, then there is no authority against us, and the case is with the appellants.

Of course all the language used in the opinion bearing upon this particular point should be read and construed together. This method of construction the appellees decline to adopt, but insist upon picking out a part only of the language and giving it, as we claim, a narrow, literal one-sided construction which all of the language taken together will not bear.

The foregoing quotations contain a declaration of the following things, either in express words or by necessary implication.

1. Reissued patents must be for the same invention; that is, they must not be for a different invention. As, for instance, if the original patent was for a steam engine, and the reissue for a water wheel, the reissued patent would affirmatively show that it was not for the same invention, but would be for an entirely different subject matter.

2. If on a comparison of the two instruments it affirmatively appears that the reissued patent is not for the same invention as that embraced and secured in the original patent, then the reissue is void.

3. When the original patent is inoperative or invalid, the reissue may be granted, and in it the invention may be redescribed so as to contain not only what was well described before, but whatever else was suggested or substantially indicated in the specifications or drawings which belonged to the invention as actually made and perfected.

4. There may be interpolated in the reissue all features, ingredients and devices belonging to the invention which were shown in the original patent or in the Patent Office model.

5. Corrections may be made in the description, specification, and claims of whatever belonging to the invention was described, or suggested, or substantially indicated in the "ORIGINAL SPECIFICATIONS," drawings, or Patent Office model.

6. Whenever terms of art are not employed in the patent, the Court will determine upon a comparison of the two instruments, whether the reissued patent is for the same invention as that embodied in the original patent.

Remembering that the reissued patent is only granted where the original is inoperative or invalid, and the fol-

lowing conclusions must be arrived at in reference to the foregoing subdivisions made for the sake of convenient and certain reference, viz.:

Sub-division 2 shows that the Court concludes that an inoperative and invalid patent may and does "embrace and *secure*" an invention which it *does not protect*.

Sub-divisions 5 and 6 show that the re-description of the invention may come from the model without being in the drawings or specifications that issue with the original patent at all; yet notwithstanding this the Court can and will ascertain by a comparison of the two patents whether they are both for the same invention or not.

Surely this could not be done where the redescription in the reissue comes entirely from the model, unless the model is a part of the original patent (as decided in Hoffheins *v.* Brandt, 3 Fisher, page 229), or unless the title or short description contained in the patent itself is held to include everything within the broad sweep of that general title or of that short, indefinite, but very comprehensive, description.

The foregoing subdivision 5 fairly and squarely shows that the Patent Office model and original specifications are placed upon the same footing, and that the "original specifications," are *in terms specifically named* (on page 545, 11 Wall.) *as the very thing the Commissioner may examine;* and if he finds the invention in them, he may grant a reissue for it.

This is the whole point in this case; and it seems to us too plain for argument, that this case of Seymour *v.* Osborn holds that the original specifications may be examined as claimed by us, and that it does not decide the contrary.

Section 5 of the Act of 1837, and section 53 of the Act of 1870, permitted several patents to issue for "distinct and separate parts of the thing patented."

The words "thing patented" here used doubtless refer to the thing patented by the reissues.

Nobel's whole inventions were made in utilizing nitro-

glycerine. One of these inventions was the method of exploding it by mixing it with explosives which were well known, and which exploded by the application of fire. One distinct and separate part of this one invention was mixing nitro-glycerine with gunpowder, another with gun-cotton, another with rocket powder, and so on. Every divisional patent issued for each one of these mixtures was valid, and the rocket-powder patent, No. 4819, was of course one of these patents.

The law allowed divisional reissues, section 5, Act of March 3d, 1837; Act of 1870, section 53.

> Goodyear *v.* Providence Rubber Co., 2 Fisher, 499.
> Same case, 9 Wallace, 788.
> Goodyear *v.* Wait, 3 Fisher, 242.
> Penn. Salt Co. *v.* Thomas, 5 Fisher, 148.
> Bennett *v.* Fowler, 8 Wall. 445.

The decision rendered in 1840 in Knight *v.* B. O. & R. R., 3 Fisher, 1, was concerning a reissue granted before the law of 1836 was passed. Both the law under which that reissue was granted and the decision itself long since became obsolete.

See French *v.* Rogers, 1 Fisher, 133, decision rendered in 1851.

Our friends upon the other side take a deep interest in the welfare and rights of the public and in arguing this case, plead for its protection. They seem to feel a deep sympathetic alarm lest an innocent public should be liable to loss some how or in some way not explained because the original specifications did not issue with the patent. That for this reason the public will be deceived, and if deceived will some how suffer on account of that deception.

While selling their infringing powder to the public, however, their sympathy is exercised in getting the largest price possible.

The defendants themselves are of course the only public that they are trying to serve. Defendants that will seize other men's inventions and fight with all their vigor and means to break inventors' patents, basing their right of seizing the inventions and breaking the patents upon no higher grounds of merit than

innocent mistakes made in getting out the patents, are not likely to die broken-hearted on account of what the public may suffer. If defendants should actually discover that the market price of dynamite powder had been kept up on account of these same patents, and that for that reason and on that account even they had sold powder at a greater profit than legitimate competition in trade would have allowed, it is doubtful even then whether the defendants' sympathy for the public or grief for its sufferings, would be overpowering enough to drive more than about one-half of them to commit suicide. It is doubtful if some few of them would not find relief even on this side of the grave, and that, too, without paying back any part of their said increased profits.

But the case of Grant *v.* Raymond, 6 Peters, 220, furnishes a full answer to the argument.

It is an answer from the highest judicial authority in the world, and its weight as authority is fully equaled by the towering sublimity of its reasoning. It was the great Chief Justice Marshall answering the great lawyer Webster. The great lawyer urged, with all the power of his mighty intellect, that after years of use by the public of a part of an invention, which the inventor had failed to patent, if he could then go back and take a reissue for the whole invention, thereby shutting up factories and stopping machinery lawfully made, that in such a case the inventor would be perpetrating a fraud upon the public, which should not be allowed. The Court answered, fully showing that the inventor was even in such a case getting less than belonged to him. The law had promised him his invention for a certain number of years, and the sense of justice and right which all feel pleads strongly against depriving an inventor of the compensation thus solemnly promised, because he has committed an inadvertent or innocent mistake.

The plea only amounts to saying, I have used lawfully, yet unfairly, your property for many years; I was enabled to do it because you made a mistake, or rather, not you, but your attorney Howson, made an innocent mistake, in taking out the patent. By your reissue you have now made it legally as well as fairly yours. Still, if I

have to give it up, it will injure me, and any injury to me would be a fraud; therefore I will not give it up so long as I can get the Courts to listen to my special treatises on fraud, the text of which is that I always wish to keep what I have got, no matter whose it is, or how I got it.

The original specifications are a part of the records. Parties wishing to know what the invention is can examine them, or get a copy of them, as easily as they can of the model or the patent that issues. I believe the common practice in investigating a patented invention is to send for a copy of the file-wrapper contents, which includes the original specifications filed.

There is no need of any one being deceived as to what may be reissued from the original specifications filed, but amended before the patent issues, any more than when such amendments are not made.

It was admitted that reissue No. 5799 for "dynamite" was without fault on the decision of this case; under those circumstances there ought to have been no doubt about our having a right to commence a new action upon that patent, and the order dismissing the bill should have saved that right, and the dismissal ought to have been made without prejudice to our commencing a new suit on that patent. This was not done. The mistake can only be corrected by this Court.

See *House* v. *Mullen*, 22 Wall. 42.

Story's Eq. Pl. § 456

If the principal question in the case is decided against us, we respectfully ask the Court to modify the decree, so as to allow us to proceed anew on said reissued patent No. 5799.

Law of 1870.

The Act of 1870, Section 53, reënacted by Section 4916 of the Revision, expressly provides for the introduction of new matter into the reissue of a process patent.

At the time that Act was passed there was well known and had long been known, two classes of patents, one with models and drawings and the other without. The last part of the section mentioned refers to the latter class of patents, which includes patents for processes, and does not refer to the former class—that is, machine patents.

The Section provides for the surrender and reissue of patents, after which follows the clause in the following words:

> "But no new matter shall be introduced into the specification, nor in the case of a machine patent shall the model or drawings be amended, except each by the other."

This clause is separated from the main body of the Section by a semicolon, and is followed by another clause, also preceded by a semicolon, in the following words:

> "But when there is neither model nor drawing, amendments may be made upon proof satisfactory to the Commissioner, that such new matter or amendment was a part of the original invention, and was omitted from the specification by inadvertence, accident or mistake, as aforesaid."

It was held by the learned Court below that this provision for new matter refers to machine patents, and only to such machine patents as have been issued without a model or drawing, but not to process patents. If that be so, then it refers only to patents which have been issued by mistake of the Commissioner, and not of the inventor, because it is, and long has been, the duty of the Commissioner to have model and drawing accompany a machine patent. At the time of the passage of the Act of 1870, no such class of patents was known, and not one machine patent in a thousand then in existence was in a condition to authorize new matter to be introduced into a reissue. It is not supposable, therefore, that Congress provided for such a contingency, that is, for new matter to be introduced into patents which had been issued through mistake of the Commissioner; on the contrary, Congress must have provided for new matter with reference to a well-known class of patents, namely, patents which were distinguishable by being without models or drawings.

The class of patents referred to in the section are those without models or drawings, and are mentioned in

contradistinction to patents, having models and drawings. The clause providing that no new matter shall be introduced, &c., and the clause providing that new matter may be introduced, are both preceded by a semicolon, and the latter does not refer to the former, but both refer back to the body of the section providing for the reissue.

As new matter was proper to be introduced into the two reissues Nos. 4818 and 4819, the learned Court below erred in sustaining the demurrer.

The grant of the reissue is *prima facie* evidence that the Commissioner did his duty, and that reissues were granted on proofs satisfactory to him that whatever new matter was introduced into the reissues, was a part of the original invention and was omitted from the specification which was attached to the original patent, by inadvertence, accident, or mistake.

It may, however, be contended on the part of the defendants that, inasmuch as there was a drawing filed with the original application for Patent No. 50,617, the reissue does not come within the purview of the last clause of the 53d § of the Act of 1870.

Unless we have entirely failed in comprehending the meaning of the enactment referred to, there is certainly no force in such an argument. The Statute must mean that where there is no drawing or model of that part of the invention which had been omitted from the original, the amendment might be made on proof, satisfactory to the Commissioner, that such new matter was a part of the original invention. Any other interpretation would make the provision a mere arbitrary enactment, without any reason for it in the nature of the case.

If the provision of the law is designed to make an arbitrary distinction between a patent which has a drawing attached to it, and one which has not, the effect would be to exclude one class of inventors from the benefit of a remedial Statute, to which other inventors were admitted, and this without any reason whatsoever. Why should a man who has a patent without a drawing be allowed to amend, on reissue, by inserting in his patent that which had been erroneously omitted, when

another man whose patent, unluckily for him, has a drawing, is deprived of the same privilege, although the drawing has no reference whatever to the omitted matter which he now seeks to restore to his patent by reissue? Surely, no Court would give such a construction to the law, if any other construction were possible. The interpretation which we suggest is not only the most natural one, but it harmonizes all the provisions of the law relating to reissues. It makes the closing clause of the 53d Section, not an exception to the law allowing amendments within the scope of the original invention, but furnishes a rule of evidence for determining in what cases extraneous evidence may be introduced, and in what cases the evidence is to be restricted to that afforded by the record itself. If the record furnishes, by means of drawing and model, or either, the required proof of what the invention was, as originally applied for, then evidence outside of the record is inadmissible; but if there be no drawing or model of the invention alleged to be omitted from the original patent as issued, then equity requires that such other proof be received as the nature of the case admits of.

In the present case the matter omitted from the original patent, and which forms the subject matter of Reissue No. 4818, is found in the original specification on the records of the Office, so that there is no need to go outside of the record at all; and furthermore, no model or drawing was filed of anything embraced in that reissue, for the reason, that the invention is not susceptible of illustration in that way, being not a machine but a combination of nitro-glycerine with gunpowder, guncotton or similar substances.

If the Patent Office had granted Nobel such a patent, as they ought to have done, at the time of his original application, all that is contained in Reissue No. 4818, would have been contained in the specification accompanying the original patent. If that had been done, the question raised by demurrer in this case would never have arisen. The specification as originally filed, and still on record, would have formed part of the original patent, and this specification, the identical instrument signed and sworn

to by the inventor, now forms the basis of the existing reissue. It is not a case of an attempt to introduce *new matter* into a reissue. The matter of the specification of this reissue is as old as the original application of Nobel; is found, *totidem verbis*, in the application originally filed, and in place of this original, an altered specification, omitting an essential part of the invention, was substituted, and issued with the original patent. Can it be supposed that when the law allows an inventor to reissue and claim that which was imperfectly described, and which he had never previously claimed as his invention, it will prevent him from reissuing so as to obtain a patent for that which he had already fully described, and *actually claimed*, merely because that description and claim were stricken out of his specification before issue? Such a conclusion would be unreasonable and inequitable, for it cannot be that the accidental circumstance of the specification having been amended *before issue* instead of *afterwards*, can deprive an inventor of that which is clearly shown by the papers in the case to have been his invention, and which the subsequent reissue proves that the Office now admits he ought to have been allowed to include and claim in his original patent. For unquestionably, if his original patent had issued with his original specification attached to it, he could have reissued and obtained exactly what is described and claimed in Reissue No. 4818.

To prove this we need only to refer to the original specification filed by Nobel with his application in the Patent Office, in which he describes the invention covered by re-issue 4,818 as follows:

> "By mixing it with gunpowder, gun-cotton, or "any other substance developing a rapid heat, "nitro-glycerine, being an oil, fills the pores of "gunpowder, and is heated by the latter to the de- "gree of its explosion. Gunpowder treated in this "way can take up from 10 to 20 per cent. of nitro- "glycerine, and develops a greater power with a "lesser quickness of explosion." (Record, p. 16.)

And one of his *claims* in this original specification is:

> "The use of gunpowder or similar substances, "when mixed with nitro-glycerine or analogous "substances." (Record, p. 18.)

As stated in the bill of complainant, Nobel's attorney filed an amended specification, a copy of which was attached to his patent as issued.

This amended specification, we must presume, was filed because the Patent Office refused to grant Nobel a patent on his original specification.

Let us see whether or not the invention covered by re-issue 4,818 is not, to use the words of the Supreme Court in *Seymour* vs. *Osborne*, "*suggested or substantially indicated in the specification which properly belonged to the invention, as actually made and perfected*," not only, but even in the specification attached to the original patent as issued.

In the specification of the original patent we find the following clause:

> "By exploding a quantity of gunpowder or other substance *in contact with the liquid* (the powder being confined in a water-proof tube or case), the heated gases derived from the powder, being disturbed throughout the mass of the liquid, raise the temperature of the latter sufficiently to decompose the same." [The liquid here referred to is nitro-glycerine.] "When powder is used for this purpose, the case containing it may be immersed in the liquid, the powder being ignited by means of a fuse, or by an electric spark. If desirable, however, the liquid may be placed in a tube, or inserted in a mass of powder, which is then ignited in any suitable manner."

No doubt this is a very imperfect description of Nobel's invention, and that the patent is "inoperative" to protect the inventor in his actual invention "by reason of a defective or insufficient specification;" but it is just for the purpose of curing such defects, and granting to the patentee what he actually invented, that the law of re-issue was enacted.

Do we not find in the specification of this original patent a suggestion of the invention of combining nitro-glycerine and gunpowder, in the statement that the inventor purposes "to explode gunpowder in contact with nitro-glycerine?" And when we read it in the light of the original specification, as filed by Nobel with his application, can there be any doubt on the question?

It is abundantly clear that Nobel ought to have had a patent granted to him on his original specification, as filed, for the mixture of nitro-glycerine and gunpowder; and we submit that there is nothing either in the letter or the spirit of the law to deprive him of the right to obtain a patent for his invention, which was specifically *claimed* in his original specification as filed in the Patent Office, as well as clearly described therein.

The law says that the reissue must be "*for the same invention.*" The courts have said it must be for the same invention as the original patent. But such cases must be interpreted in view of the facts involved in the decisions. Where, as is usually the case, the specification of the original patent is the same specification as originally filed in the application, the addition to the law of the words 'in the original patent,' do no injustice; but in the cases where the original specification as filed has been altered after filing, so as to omit part of the invention, such a judicial addition to the statute is a material alteration which would do serious injustice to the inventor.

In the case of *Morey* vs. *Lockwood*, 8 Wall., 230, we have an instance in which the inventor, having filed a caveat describing his invention, obtained a patent in which the specification was so amended as to limit its scope very seriously. A reissue was afterwards obtained restoring the specification so as to embrace the full invention described in the caveat, and the patent so reissued was sustained by this Court.

We submit that the Court erred in making a final decree dismissing the complainant's bill.

The bill having been filed on three reissued patents No. 4818, No. 4819, and No. 5799, the demurrer filed by the defendants denied the equity of complainant's bill generally as to all matters contained therein, and then specifically as to each of the three patents sued upon.

The demurrer also alleges that the bill is defective for multifariousness, which goes to the whole bill. Also, for ambiguity and uncertainty: and lastly, because complainants had no equity to propound the interrogatories contained in the bill.

Now it appears from the opinion of the Court delivered by Mr. Justice Field, that the demurrer was sustained no further than to hold that two of the reissues sued upon, Nos. 4818 and 4819, were invalid, leave being given to the complainant to amend the bill by striking out all such parts as referred to the reissued patents Nos. 4818 and and 4819, the Court saying that "upon the validity of the reissue [No. 5799] no question is made."

It appears, therefore, that in the judgment of the Court the bill of complaint was not demurrable for any of the reasons set up in the demurrer, excepting as to the validity of two of the patents; and that a good cause of action remained as to one of these patents, No. 5799.

"Although the effect of allowing a demurrer to the whole bill is to put the case out of Court, the allowance of a partial demurrer is not attended with such a consequence. The bill, or that part of it which was not covered by the demurrer, still remains in Court, and the plaintiff may obtain an order to amend, or adopt any other proceedings in the cause in the same manner that he might have done had there been no demurrer. Where an order was made allowing the demurrer and giving leave to amend, and no amendment was made within the proper time, it was held that the bill was not out of Court."

Daniel's Chancery Practice, 4th Ed., p. 598, Ch. xiv., §5.

In the case of *Livingston* v. *Story*, 9 Pet., 632, the defendant in the Court below demurs to the whole bill, and for cause shows that the complainant has not by his said bill made such a case as entitles him in a Court of Equity to any discovery from this defendant, touching the matters contained in the bill, nor any or either of such matters, nor to entitle the said complainant to any relief in this Court, touching any of the matters therein complained of; the want of proper parties is also assigned for cause of demurrer. The Court below did not notice the want of parties, but sustained the demurrer on the other causes assigned."

The Supreme Court in this case say, "*If any part of*

the bill is good, and entitles the complainant, either to relief or discovery, a *demurrer to the whole bill cannot be sustained*. It is an established and universal rule of pleading in chancery, that a defendant may meet a complainant's bill by several modes of defense. He may demur, answer and plead to different parts of a bill. So that if a bill for discovery and relief contains proper matter for the one and not for the other, the defendant should answer the proper and demur to the improper matter. If he demurs to the whole bill, the demurrer must be overruled." (9 Pet. 657.)

That case, we submit, is decisive of the question that the demurrer in this case should have been overruled, and that the order sustaining the demurrer or the decree based thereupon were erroneous.

After the Court delivered the opinion on the demurrer, an order was made "that the demurrer be sustained, with leave to complainant to amend said bill of complaint herein on or before next rule day." (Record, p. 27, fol. 76.)

This order we submit was broader than was warranted by the decision of the Court. The demurrer, if sustainable at all, should have been only sustained in part under the decision rendered in the case.

The demurrer, it is true, was general, and went to the entire equity of the bill, and also contained special averments as to distinct parts of the bill. So far as the general demurrer is concerned, it must be taken not to have been sustained, and being bad in part ought not to have been sustained at all.

The complainant having failed to amend its bill by the time fixed by the order of Court, a final decree was entered by the Circuit Judge on 11th October, 1875, dismissing complainant's bill with costs (Record, p. 28, fols. 79, 80).

This we submit was an error. It is true that the complainant had leave to amend his bill if he chose to do so, but it ought not to have been compelled to take this course, or to expose itself to the alternative of being put out of Court by the dismissal of the bill.

And the reasons for this are obvious. It was admitted

by the Court that a good cause of action remained, notwithstanding the alleged invalidity of two of the three patents sued upon, and this cause of action the complainant was entitled to have heard after testimony taken, from which it is debarred if this final decree is sustained.

The only way in which complainant could avoid the granting of this final decree dismissing his bill as to Reissue No. 5799 without hearing, under the order of the Court, would have been to have amended the bill of complaint by withdrawing all reference to Reissues No. 4818 and 4819, and thereby depriving itself of its right to have the opinion of this Court on the validity of these patents.

We submit that the proper course would have been to have made an interlocutory decree dismissing the bill as to the two patents Nos. 4818 and 4819, and ordering the case to proceed as the third patent No. 5799, or to have suspended the order as to the two reissues, which were held to be invalid, until after final hearing on the merits as to Reissue No. 5799.

"A demurrer [when properly drawn] demands judgment of the Court whether the defendant shall be compelled to make any further or other answer to the plaintiff's bill, or that particular part of it to which the demurrer applies."

Daniel's Chan. Prac., vol. 1, p. 543, ch. xiv., §1.

There is no such prayer, nor indeed any prayer at all, in the demurrer filed by defendants in this case (Record, p. 23, fol. 67), but this prayer embraces all that the defendants can ask or should obtain on demurrer; and it indicates clearly what the order of the Court ought to have been, when sustaining the demurrer in part only; namely, that the defendants were not required to answer as to Reissues Nos. 4818 and 4819, leaving them to answer the bill as to the other patent, No. 5799, which was not affected by the decision of the Court on the demurrer.

There was no necessity for the amendment of the bill, inasmuch as there was no defect in form, nor was it held bad for multifariousness, nor for ambiguity; and the complainant had a right to a hearing on the merits as to

the third patent, No. 5799, without being put to the alternative of losing his right of appeal to this Court, on the question as to the validity of Reissues No. 4818 and 4819, which would have resulted from his amending the bill as required by the order of the Court.

We submit further that under the opinion of the Court (Record, p. 69, fol. 214) the demurrer ought not to have been sustained at all.

"A demurrer cannot be good in part and bad in part, which would be the case if a demurrer, professing to go to the whole bill could be supported by the allegation of a ground of demurrer which applies only to part."

Daniel's Chan. Prac., 4th Ed., p. 589, ch. xiv., § 3.
Marshall v. Vicksburg 15 Wall 146-149

The first clause of the demurrer (Record, p. 21, fol. 60) is a general demurrer that the bill has no equity "as to the matters contained in said bill or any of such matters," and afterwards sets up several specific causes of demurrer, none of which is sustained by the opinion of the Court, excepting those which affect the two reissues, Nos. 4818 and 4819.

We submit, therefore, that a decree sustaining the demurrer generally was erroneous, inasmuch as it is not even alleged that there was anything whatever in the bill to impeach the validity of the patent Reissue 5799.

We submit further, that it was error for the Court to decide the question of the validity of the patents (Reissues Nos. 4818 and 4819), on demurrer to the bill.

The practice adopted in this case was, to say the least of it, a novel one, unwarranted by any precedent.

It is a proposition too clear to need citation of authority, that on demurrer to a bill of complaint, all the allegations of the bill which are well pleaded must be taken as true, and no evidence *aliunde* can be admitted to prove any fact not set up therein, or to disprove any of its allegations.

The point on which the Circuit Court held Reissues Nos. 4818 and 4819 to be invalid, was that these reissues were not for the same invention as the original.

This is a question which should not be decided without affording the parties an opportunity to offer evidence for the consideration of the Court.

Seymour *v.* Osborne, 11 Wallace, 546.
Battin vs. Taggart, 17 How., 74-85.

It is true that a chancellor decides questions of fact as well as of law; but it is equally true that he will not presume that he has all the facts before him until the parties have had the opportunity to submit their proofs and testimony.

It has been held that in suits for infringement of patent, although the complainant sets up the grant of his original patent, and of the reissue based thereon, and alleges that the reissue is for the same invention, he is not required to put the original patent in evidence. It is for the defendant to do this if he chooses.

Seymour *v.* Osborne, 3 Fish. 355, and 11 Wallace, 516-546.

In the present case, however, the Court first ruled the complainant to file its patents (Record, p. 28, fol. 82) and after it had so filed them (both the originals and the reissues), the Court examine them and pass upon the validity of the reissues, on the strength of the evidence thus compulsorily produced.

A demurrer must be sustained, if at all, on matter contained in the bill of complaint, if it goes to the merits of the case. The practice is for the bill to set up the patent or patents which are alleged to be infringed; the patents, however, not being produced until the testimony is taken after the case is at issue. But in this case the defendants, by compelling the complainant to file its patents in Court as a part of its bill, and then filing a demurrer, not only deprived the complainant of the opportunity of taking testimony in support of its patents, but obtained a decision on the demurrer, based, not alone on matters contained in the bill, but on evidence which they were required to produce for that purpose. We contend that it was error for the Court to go outside of the bill as filed, in deciding the questions raised by the demurrer.

And especially is this the case where the patents are of that class of reissues which admit of evidence of their validity, outside of the patents of which they are reissues.

And lastly, the facts set up in the bill of complaint, and necessarily admitted by the demurrer, are sufficient to entitle the complainant to a decree.

It is distinctly alleged in the bill that Alfred Nobel was the original and first inventor of the subject matter of the several patents in suit; that the patents were duly granted, that the surrenders and reissues were duly made, *that the reissues were for the same inventions*, that the title was in complainant, and that the defendants had infringed each of said patents sued upon. (See Record, pp. 11-13.) These facts being admitted by the demurrer are sufficient to establish complainant's equity and to entitle it to a decree.

See Walford's Equity Pleading, pp. 261-265.
Kay *v.* Marshall, 2 Webs., P. C., 39; 1 Myl. & Cr., 373.
Westhead v. Keene 1 Beavan 287

If any of these facts are denied by the demurrer, it is no longer a demurrer, but a plea by demurrer, which is bad, and therefore should have been overruled.

Not one of the special causes of demurrer was sustained by the Court below; and under the ruling of this Court in Livingstone vs. Story, before cited, the general demurrer should not have been sustained.

WILLIAM BAKEWELL,
M. A. WHEATON,
for Appellant.

No. 63.

In the Supreme Court

OF THE

UNITED STATES,

THE GIANT POWDER COMPANY, *Appellant*,

vs.

THE CALIFORNIA POWDER WORKS, ET AL. *Appellees*.

Argument of Appellees on Demurrer.

C. R. GREATHOUSE,
Of Counsel for Appellees.

Philadelphia;
BURK & McFETRIDGE, STEAM BOOK AND JOB PRINTERS,
Successors to Inquirer Printing House, 304 Chestnut Street.
1878.

IN THE

Supreme Court of the United States.

No. 63.

THE GIANT POWDER COMPANY,
Appellant,
vs.
THE CALIFORNIA POWDER WORKS
ET AL.
Appellee.

ARGUMENT OF APPELLEE ON DEMURRER.

This was a suit for an alleged infringement of three letters patent. Two of these patents are based on one original patent, being original patent No. 50,617.

In 1865, Noble obtained a patent No. 50,617. In 1869, this original patent was surrendered by the United States Blasting Oil Co., as assignees of Nobel, and four divisional

patents reissued upon said surrender, viz: reissue Nos. 3377, 3378, 3379, 3380. In 1872, one of these divisional patents reissue No. 3380, was surrendered by the same Company and two new patents reissued upon said surrender, viz: Nos. 4818 and 4819.

This gave to this Company five patents in place of the original patent, No. 50,617. assigned to them by Nobel, viz: No. 3377, Division A; No. 3378, Division B; No. 3379, Division C; No. 4818 and 4819. The two last are those which defendants are charged with infringing.

The "Infusoria Patent" is reissue No. 5799, being a reissue of a reissue of original patent No. 76,317.

The patents are made part of the bill and the demurrer raises fully all questions with regard to each patent.

I.

The title of complainants is not sufficiently stated.

1 Bright. Dig. p. 725, Sec. 24.
Curtis on P., Sections 350 and 405.
Kay *vs.* Marshall, 1 Mylne & Craig, 373.

It appears that Nobel was an alien, but there is no allegation that his inventions were put and continued on sale to the public on reasonable terms within eighteen months from the issue of his patent.

1 Bright. Dig. 732, sec. 45.
Curtis on P., Sec. 351, and cases there cited.

There are no reasons given why the reissues were made. No statement that the original patent was inoperative or in-

valid, but upon the other it is alleged that the patents for all five of the inventions was issued in due form, etc. (See Bill, page 2, lines to 14 inclusive, and page 3, lines to 13, inclusive.)

II.

Original patent No. 50,617, was void, because, as alleged in the bill, it undertook to secure several distinct inventions.

Barrett *vs.* Hall, 1 Mason, 474–5

Moody *vs.* Fisher, 2 Mason, 119.

One of the five inventions was for application and use of the *cap* which was used to explode an old and well known explosive—to wit: nitro-glycerine—and another for a *new compound*, one of the peculiar features of which compound was that it exploded without the cap.

See page 2, line 12, Patent No. 4819.

The two are in no way connected in use or principle, except that they relate to the general subject of blasting.

III.

But we contend that the statement that these five inventions were patented in the original patent, No. 50,517, is in fact untrue, and that this must be held as matter of legal construction, on an inspection of the patent which, as we have seen, has been filed as a part of the bill.

It will be noticed that re-issue No. 4818 is for two compounds or compositions of matter—one being for a compound

composed of nitro-glycerine and gun powder, the other of nitro-glycerine and gun cotton, and that re-issue No. 4819 is also for a composition of matter composed of nitro-glycerine and rocket-powder. Neither of these patents is for a process of exploding nitro-glycerine, or for any particular use, but simply for new compounds, made by mixing together old and well known substances.

Now, an inspection of the original patent, No. 50,617, upon which these re-issues are based, shows that none of these compounds are mentioned or suggested therein.

The patent being for the use of nitro-glycerine in a liquid state, pure and simple, without combination with other substances, and the idea of any mixture with powder of any kind is expressly negatived, because in the only place in the patent where powder is mentioned it is distinctly declared that the powder must be kept separate and unmixed from the nitro-glycerine.

We contend that since it appears upon the face of the patents that the composition of matter mentioned in said two re-issues were not only not covered by or mentioned or suggested in the original patent, but expressly negatived, the re-issues were void, as a matter of law, for want of authority in the Commissioners to issue them.

Seymour *vs.* Osbourne, 11 Wallace, 543-6.

Complainants undertake to obviate this difficulty by asserting that Nobel, in the first instance, filed with his application a memorandum, in which it is stated as one of

the modes of exploding nitro-glycerine that it might be mixed with gunpowder or gun-cotton and analogous substances.

This presents in the first place the question as to whether such a memorandum, filed under such circumstances, *can be made the basis of re-issues, in cases where the invention named in the re-issues is not mentioned or suggested, but expressly negatived, in the specification and drawings of the original patent.*

We hold that this cannot be done. Section 53 of the Act of 1870 (16 Statutes at Large, 206), declares with respect to re-issues that the owner of a patent may surrender it and obtain a re-issue "for the same invention." * * Also, that "no new matter shall be introduced into the specification; nor in the case of a machine patent shall the model or drawing be amended except each by the other, but where there is neither model or drawing, amendments may be made upon proof satisfactory to the Commissioner that such new matter or amendment was a part of the original invention and was omitted from the specifications by inadvertence, accident, or mistake, as aforesaid."

In Tarr *vs.* Webb, 10 Blatchford, 99 S. C., 5 Fish. P. C., 596, the learned judge expressed the opinion that the provision of this section permitting proofs outside of the specification as to the scope of the invention, where there was neither model or drawing, was limited to machine patents, and did not extend to a chemical or composition patent.

The counsel for complainants say that this is mere *obiter dicta*. We have not pretended that the decisions of the New

York Circuit Court are of binding force upon this Court, but the opinion whether *dicta* or not, of a learned judge who has investigated the subject, is entitled to consideration, and we think him fully borne out by the statute.

But the correctness of this construction becomes immaterial in view of the fact that there was a drawing attached to the original patent.

In addition to this there are elaborate drawings illustrating every part of the invention claimed in the four re-issues of 1869.

There being a drawing and no model, the Commissioner had no power to go outside of the specifications and drawings of the original patent in granting the re-issues.

We think this view sustained by all the authorities. The Court in Seymour *vs.* Osborne, 11 Wallace, 544, says: "Re-issued letters patent must by the express words of the section authorizing the same, be for the same invention, and consequently when it appears on a comparison of the two instruments as a matter of law that the re-issued patent is not for the same invention as that embraced and secured in the original patent, the re-issue is invalid," etc. * * *

It is *clear that the Commissioner has no jurisdiction to grant a re-issue unless it be for the same invention as that embodied in the original letters patent,*" etc.

Again on page 545: "Matters of construction arising upon the face of the the instrument are still open. Letters patent

reissued for an invention substantially different from that *embodied* in the original patent are void, as no jurisdiction to grant such a patent is conferred by any Act of Congress upon the Commissioner, and he possesses no power in that behalf, except what the Acts of Congress confer. Whether a re-issued patent is for the same invention as that embodied in the original patent, or for a different one, is a question for the Court in an equity suit."

This decision has never been questioned or limited by the Supreme Court, and has been frequently cited with approbation by the Circuit Courts.

In Chicago Fruit House *vs.* Busch, 4 Fisher P. Cas. 401, it is said that the decision of the Commissioner on question of reissue is conclusive, "unless it is apparent upon the *face* of the patent that he has exceeded his authority, or that there is such a repugnancy between the old and the new patent that it must be held as a matter of legal construction that the new patent is not for the same invention as that contained in, and secured by the original patent."

In Sarven *vs.* Hall, 9 Blatchford 526, S. C., 5 Fish. P. C. 410, the Court say: "It is conceded by the counsel for the complainant (Messrs. John S. Beach, Samuel S. Fisher, and Chas. M. Keller), that nothing can be legally claimed in the reissue which does not appear either in the *specifications annexed to the original patent, or in the drawings, or in the model, even though it was in fact the invention of the patentee, and its use contemplated by him when the patent was applied for.*" * * "Devices not described or specified may, if they are the inven-

tion of the patentee, be the subject of a patent, subject to all other rules governing the inventor's rights, but it is not the office of a reissue to embrace them;" and after citing Seymour *vs.* Osborne, the learned Judge declares that the rule is not only correct in principle, but settled by that case, p. 527.

In Sickles *vs.* Evans *et. al.*, 2 Cliff, 222, the Court after using almost the identical language afterward adopted in Seymour *vs.* Osborne, says: "I am of the opinion that the reissued letters patent, under consideration, must be deemed invalid, for the reason that the patent is not for the same invention as that *embodied and secured in the original patent, which fully appears as matter of law from a comparison of the two instruments;*" so in Carew *vs.* Boston Elastic Fabric Co., 5 Fisher, P. C. 99, it is said: "It is clear that the Commissioner has no jurisdiction to grant a re-issue unless it be for the same invention as that embodied in the original letters patent." See also

Parham *vs.* American Button-hole Machine, 4 Fisher, P. C. 471.

But counsel for complainants contend that the language of these learned judges is inapt, and used without a proper appreciation of the force of words, or of the subjects concerning which they were rendering judgments.

We cannot agree with the counsel. We think the language clearly within the law and evidently used with great caution for the purpose of establishing beyond all cavil a uniform, consistent and just rule.

Nor can we perceive how under a statute a different rule could have been laid down.

The statute declares that no new matter shall be introduced into the specifications.

Rights and interests of great value are vested and divested by re-issues, and it is absolutely necessary, where they depend entirely upon the construction of the instruments, that we know which paper or what instrument is the "specification" within the meaning of the law; some paper must be adopted as the "specifications."

Ought we to take the paper that the inventor declared and published to the world was his specifications, which he adopted and attached to the patent as part of it, or must we take a memorandum which he abandoned as soon as filed, and which he never made any further attempt to use?

By way of illustration let us reverse the case.

Suppose an inventor should file an application, and by mistake entirely omit from his original description any mention of one of his devices, but on the same day should, with the consent of the Commissioner, file an amendment, including the omitted device, and the patent was issued with the specification as amended.

Could it afterwards be maintained by either the government or an infringer, that a reissue for this device was void because the device was not claimed in the original memorandum?

Such a point, if raised, would be swept away in an instant by an overwhelming array of authorities, and we do not think counsel could be found who would seriously contend that a device described, embodied and claimed in the original patent, could not, in the case we have put, be made the subject of a reissue, and that the specification annexed to the original patent was not the specification referred to in the statute.

With these facts in view, we do not think it can be maintained that the Courts, in saying the invention made the subject of a reissue "must be embodied in the original patent," or as distinctly declared in Sarven *vs.* Hall, must "appear in the specification annexed to the original patent," have rendered ill advised or inartificial opinions.

IV.

The practice which complainants seek to establish would *be a fraud on the law, and opposed to the whole theory of our patent system.*

It will be noticed that Nobel, an alien, filed with his application a memorandum claiming five different inventions. The complainants seek to avoid this by contending it was for but one, but the allegations of the bill (page 2, lines 5 to 11 inclusive), as well as the memorandum show, that there were five or six.

His attorney, duly authorized, on the same day filed an amended specification, striking out any allusion to any mixture, and simply claiming and describing the use of liquid

nitro-glycerine, pure and unmixed, and the patent was issued and recorded with this specification, covering only certain methods of using liquid and unmixed nitro-glycerine. But one government fee was paid, and no attempt was made by new and independent applications to patent or secure any of the mixtures. Noble afterwards assigned his patent to the U. S. Blasting Oil Co., and they, in 1869, surrendered the patent and obtained on it four different patents, embracing in all eight different claims. No mention is made of a mixture here, and it was not until 1872 that any claim for a compound was made in a patent, or any public notice given, that Noble or his assignees claimed or had invented such a compound, and yet, under this state of facts, complainant assert that Noble in 1865 secured these compounds and can cut out all intermediate inventors.

Under our patent laws, a citizen may protect himself and secure time to develop "an idea" by a caveat. He must pay his caveat fee, and is, in any event, only protected for one year.

This provision does not extend to non-resident aliens (Sec. 40 Act of 1870, 16 Stat. at Large, 203.)

The memorandum filed shows that Nobel did not intend to patent, and laid no claim to the invention of a "compound." He only suggested that gun powder would heat up nitro-glycerine "to the degree of its explosion." (Page 15, of Bill.) In fact, his ideas or theories, as stated in this memorandum, were, that the impulse of explosion was given to nitro-glycerine by heat and confinement. This is carried into

the original patent, and also in the series of reissues of 1869. But now, it is admitted that these theories were false, and that the impulse is communicated by *detonation*, (see lines 11, 12 and 13 of page 2 of Bill), and we may add that the subsequent reissues proceed upon the detonation theory.

Still it is here claimed that Nobel, by simply filing a memorandum, false in theory, and not claiming the compound, but only by implication suggesting it, and which was immediately abandoned, secured to himself and assignees the compounds claimed in reissues No. 4818 and 4819: *thus securing without the payment of caveat fees and without compliance with any of the requirements of the law to a non-resident alien for this long period, rights which the statute only intended to secure to citizens through caveat proceedings, for one year.*

Again, such a practice would permit a party to file with an application a memorandum or treatise containing a hundred different ideas or suggestions of inventions and pay but one fee and take out a patent for but one invention, and then remain quiet until other inventors, who, unaided by his published patent, and unaware of his memorandum filed among the tons of paper in the patent office, had discovered and put in shape and practical operation, some of the inventions which he had only dimly conceived, and actually suppressed, and then claim that his rights ante-dated theirs, and demand and obtain from the Government, monopolies in the shape of separate re-issues for each of these inventions, which re-issues date back and conclusively stand as of the date of the first patent.

Reissues obtained under such circumstances would manifestly be fraudulent, but the subsequent inventors would under the decision we have cited, be cut off from raising any questions of fraud, and robbed of all their rights by the presumptions of the law.

When it is remembered that reissues are obtained *ex parte* and in such numbers that it is impossible for the commissioner to investigate the cases individually, it will be perceived that the possibility and danger of fraud is great, and we think an examination of the face of the papers in this record will show that such fraudulent proceedings are not only possible but accomplished facts.

See as bearing on this point:

Pennock *vs.* Dialogue, 2 Peters, 19.

Kendall *vs.* Winsor, 21 Howard, 329.

Again: the statute requires the applicant for a patent to "describe his invention in such full, clear, concise and exact terms as to enable any person skilled in the arts, "to construct and compound the same, etc., (see 26 of the act of 1870.) An inventor must contribute the knowledge of the invention or discovery to the public, and in return he obtains his monopoly for the term of the patent. An alien, was, under the law through which the patent in question was obtained, required to do more. He was required to put and continue on sale to the public on reasonable terms the invention for which his patent was issued within eighteen months after the patent was obtained. (Sec. 15, act of 1836, 1 Bright Dig., 732.)

A citizen had a right to lock up his invention for fourteen years and refuse for that term to let the public do more than share in the knowledge which the facts of the invention imparted. Under these circumstances the reasons (strong enough to be of controlling weight as we shall hereafter see) requiring the publication of the invention in the original patent, at the commencement of the term, are to some extent theoretical rather than practical, but in the case of an alien where the invention must be put on sale, and a citizen has a right to improve upon it, and demand that the alien or owner of the patent sell to him the right to use it with the citizen's improvements, on reasonable terms, the duty to publish the invention so that others may buy it becomes imperative, and the question assumes a different aspect, and the right of the public to the knowledge is tangible and capable of computation.

We have viewed this matter as one of public policy only; but upon the other hand, the rule sought to be established would prove peculiarly unjust and harsh.

For seven years the public had no intimation that Nobel had ever claimed to have invented the compounds his assignees are now undertaking to monopolize. In every possible way the public were misled; not only was there a failure to claim or describe or suggest a compound, but the idea of a mixture of the powder with nitro-glycerine was, as we have seen, excluded.

Parties desiring in good faith to make these compounds had a right to conclude, on an inspection of the patents, that

the compounds or mixtures were not embraced within them and that with the drawings attached it was impossible that reissues could be granted for mixtures entirely foreign to the patents. In this way they would in good faith purchase junior patents describing these mixtures, and in pursuance of a prudent and altogether justifiable business policy, permit rivals in the trade, who were better posted in the tricks of the patent office and the expansive powers of reissues, to obtain the Nobel patents, and then destroy their business and junior patents by fraudulent issues.

Nobel, the alleged inventor, has never claimed the mixture, but the assignees of his original nitro-glycerine patent now say to the public: "It may be true that you had no notice of our claims; that the old patents misled you; that upon the faith of its statements you made inventions, obtained patents, expended money, acquired and sold and bought what you had a right to think were vested rights, but our assignor, seven years ago, filed a memorandum at Washington by which all inventions have been held in abeyance; and since we have by *ex parte* and—it may be—fradulent proceedings procured reissues on this memorandum, our rights conclusively relate back for seven years to the old patent, and we will, by the aid of courts of equity, divest you of all your rights, break up your business and close your manufactories. You have no remedy; the presumptions of the law are for us; we are protected by them from all investigation as to fraud or intermediate facts."

We protest against the establishment of a rule that would lead to such unjust and remediless results, and in view of the

course adopted on the oral argument and the statements which were made outside of the record, we feel justified in saying th a the picture we have drawn is no creation of fancy or suggestion of a possibility, but the statement of a real case.

We call attention to the fact that whatever rule be adopted in this respect must be unvarying and uniform; under the decisions, no inquiry as to facts is permitted; the courts can only look at the face of the patents, and are precluded from investgatiions of any particular case, or to relief from any particular hardship or fraud.

If the reissue is for any purpose held valid, the statute declares that it and "*the corrected specification shall have the same effect and operation in law*" *as though they had been filed with the original patent.* (Sec. 53, Act of 1870.)

With these facts and reasons in view, we are not surprised that the Courts should hold that the subject of the reissue must appear on the face of the old patent or in the model.

Again it appears that the invention was mentioned and described in the original patent, that the public had full benefit of it, but that the patent was technically invalid because it failed to give "proportions, sizes and distances, (p. 239,) and it was held that "*the communication of the discovery to the public had been made,* in pursuance of law with the intent to exercise a privilege which was the consideration paid by the public for the future use of the machine," p. 244.

The learned counsel also cite and rely upon Hussey *vs.* Bradley, 2 Fish. 271, but this case was doubted in terms and limited by the same Court in Sarven *vs.* Hall, 9 Blatch. 526, and overruled in principle by Seymour *vs.* Osborne and the other cases we have cited.

Counsel also cite *ex parte* Ball, *ex parte* Dyson and other cases, which arose many years ago in the Patent Office, but these all proceeded upon the theory that all facts with regard to the reissues could be examined by the Court, and were clearly overruled by Seymour *vs.* Osborne, and are manifestly inconsistent with the Act of 1870.

There is another view of this matter which we think will militate against the rule for which complainant contends. Nobel was an alien, and in a contest between an alien non-resident and a citizen as to a priority of invention, the fact that the invention was known or used in a foreign country does not prevent the applicant here from procuring a patent if he believed at the time of the application that he was the true inventor, and the invention had not been patented or described in a printed publication. If after 1865 and before 1872 a person, without the aid of Nobel, has invented any of the mixtures of powder and nitro-glycerine, and made application for and obtained a patent, his patent could not be successfully assailed by the fact that Nobel invented or used the mixtures in a foreign country, but if Nobel's assignees are permitted to maintain their re-issues, such invention and such patent is ante-dated and overturned, although there may have been no publication or patent in a foreign country, and no publication or use here.

Again: such a rule would permit the issuance of two sets of patents to different persons for the same invention, each patent under the law being of equal validity. In view of the fact that some of the inventions were omitted, it is to be presumed that the commissioner refused to permit them to be included in the same patent with other inventions.

In a case like this no one would question Nobel's right to file new and independent applications for patents for the omitted inventions, and obtain separate and independent patents for the same.

He *would obtain his subsequent patents by virtue of his rights as inventor and not by virtue of his ownership of the first patent, and it would be immaterial whether or not he was, at the time the owner of the first patent.*

Each patent would be an original; each would be independent from the others, and the rights acquired under each would date from the time of their respective issues.

Upon the other hand the reissues are based on the first patent, issued to the owners of that patent, as a matter of right and by virtue of their ownership.

If the right to reissue for these omitted inventions, vested in the assignees of the original patent, Nobel could not have divested it by his separate applications and patents.

Now suppose each party should undertake to patent the omitted inventions: Nobel by virtue of his rights as inventor

and the assigns through reissues of the first patent assigned to them. Which would have the better right? And if patents were issued to each, which would be valid?

But it is clear that the right to make an independent application, excludes the possibility of the right to obtain a patent for the same invention by a reissue. The two rights spring from a different state of facts and different sources. The patents in each case are tested by different rules and divest or vest different interests.

The option to pursue either mode in procuring a patent cannot exist at the same time. The one is totally inconsistent with the other.

V.

We contend even if we are wrong in our views when applied to single reissues of patents, still that as declared by the statute, divisional reissues can only be obtained for *parts of the thing patented.*

Sec. 53, of the Act of 1870 contains the following: "The Commissioner may, in his discretion, cause several patents to be issued for *distinct and separate parts of the thing patented,* upon demand of the applicant, and upon payment of the required fee for a reissue for each of such reissued letters patent."

Now, is there any presumption which would make a court hold that either of the mixtures or compounds mentioned in reissues Nos. 4818 and 4819 were *patented* by the original No. 50517?

Can it be said that a certain compound or composition is *patented* by a patent in which there is *no allusion or suggestion of the compound, and where all idea of such compound is expressly and in terms excluded?*

No case can be found where divisional reissues were given exclusively for things not mentioned in the original.

We call attention to the fact that the various parts of the invention actually embodied in the original, No. 50,617, are patented and secured in the other divisional reissues, viz: Nos. 3377, 3378 and 3379.

It was contended that the Courts would presume that the Commissioner required Nobel to furnish a specimen of the composition of matter, and that this was a *model* upon which the re-issue was based. Nothing of this kind is set up in the bill, and it certainly cannot be said that the Commissioner required him to furnish a specimen for a composition which he had abandoned.

But the specimen is nowhere made a model. It is furnished, not for record, but for experiment, (Sec. 28, Act of 1870) and in no respect a model within the meaning of Sec. 53. This was expressly held in the matter of Mayall's Patent, 4 Off. Pat. Office Gaz. 582.

Besides, this reference to the model is by Sec. 52, in terms limited "*to a machine patent,*"

We do not see how any injustice is done Nobel, or his assignees, by the rule we claim has been established.

He could at any time, and he and his assignees can now by proper applications, obtain patents for any invention he may have made. Such patents would date as of their issue, and be subject to ordinary rules respecting patents, (Sarven *vs.* Hall, cited *supra.*) If during the delay of seven years to move in the matter, any other persons have made improvements or independent inventions, without his aid, he has no right to complain. If he had published in his patent a description of the mixtures, the hardships would be apparent; but this he did not do; he gave the public nothing, and must stand, if at all upon his legal rights.

Burr *vs.* Duryea, 1 Wall., 577–581.
Whitely *vs.* Swane, 4 Wall., 129.
Case *vs.* Brow, 4 Wall., 328.
Hitchcock *vs.* Freeman, 3 Fish., 538.

In addition to all this, No. 4819 is not even supported by the memorandum, no mention being made of any kind in the memorandum, the original patent or the re-issues of 1869 of rocket powder in any shape or for any purpose. The first intimation that we have of rocket powder is in the year 1872, in the re-issue 4819.

Complainants' counsel seek to answer this by showing that the memorandum speaks of the "use of gunpowder or analogous substances." But this cannot avail them, because the

fact that separate patents are issued as well as the face of the patents, show that the compounds are different. If mere equivalents, of course they are not the subject of different patents. Each patent covers not only the composition claimed, but equivalents, and if this practice were permitted there would be two patents covering the same thing, each bearing the same date and of equal validity.

The fact that complainanants were unable to procure, in the shape and under the guise of a re-issue, a patent for a composition entirely foreign to the original papers, and in no way connected with the inventions of Nobel, is a startling and strong argument in favor of the points we are attempting to make.

VI.

Re-issues Nos. 4818 and 4819 are void because the proportions of the ingredients in the compounds are not given.

In No. 4818 it is stated that thirty per cent. of nitro-glycerine, more or less, can be used.

But in No. 4,819 no proportion whatever is given, and we are left entirely to conjecture.

It was said on the oral argument that it embraced every mixture that could possibly be made of nitro-glycerine and rocket-powder, and that it was immaterial whether there was a mere grain of powder to a keg of nitro-glycerine or a drop of nitro-glycerine to a keg of powder, but an examination of the patent (4819) shows that this cannot be true. It is there

stated that nitro-glycerine will not explode by simple contact with fire. It is also stated as one of the chief characteristics of this composition, made by mixing nitro-glycerine and rocket-powder, that it is easily exploded by simple contact with fire.

Now, how much powder must be mixed with nitro-glycerine to change its properties so that it will become an explosive by simple contact with fire is not stated in the patent, and could only be ascertained by experiment. If anything is left to be determined by experiment, the patent is void.

Wood *vs.* Underhill, 5 Howard, S. C. 4.
Tyler *vs.* Boston, 7 Wall, 327.
Seymour *vs.* Osborne, 11 Wall, 555.

The bill is multifarious. It is brought against a number of defendants, but there is no allegation of a confederation, or of any joint acts, or joint infringement. It is also brought upon three patents, each of which is for separate and different compounds. The composition unlike a machine, is a single thing, and cannot consist of different parts. As soon as it becomes one composition of matter, it ceases to be another. It cannot, therefore, be said that the defendants are making a compound, which at one and the same time is three different compounds, and also each of the three compounds.

C. R. GREATHOUSE.

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C. R. GREATHOUSE.

Supreme Court of the United States

No. 63.

THE GIANT POWDER COMPANY, *Appellant*,

vs.

THE CALIFORNIA POWDER WORKS, JOHN H. BAIRD, N. G. KITTLE, JOHN O. EARLE, J. B. HAGGIN, G. P. LAWSON, THOMAS POWNING, WILLIAM WILSON and JOHN MEERLANDER,
Appellees.

APPELLEES' BRIEF OF POINTS.

GEORGE HARDING,
Counsel for Appellees.

Supreme Court of the United States,

No. 63.

THE GIANT POWDER COMPANY,
Appellant.

vs.

THE CALIFORNIA POWDER WORKS, JOHN H. BAIRD, N. G. KITTLE, JOHN O. EARLE, J. B. HAGGIN, G. P. LAWSON, THOMAS POWNING, WILLIAM WILSON and JOHN MEERLANDER.
Appellees.

APPELLEES' BRIEF OF POINTS.

I.

The order of the court below, sustaining the demurrer of appellee, was a proper one.

The question raised by appellees' demurrer, which was passed upon by the court below, was, whether upon the face of the pleadings and exhibits attached

II.

1. As to the correctness of the decision made by the Court below, viz: that the reissued patents and the original patents were to be compared on their face to ascertain if they were for the "same invention," the appellees refer to the following authorities:

Act 1870, Revised Statute, 2d Ed., Sec. 4916, page 950-51.

Seymour *vs.* Osborne, 11 Wall. 516.

Dyson *vs.* Dansforth, *et al*, per Grier, *J.* 4 Fisher, 133.

U. S. Felting Co. *vs.* Haven, per Treat, *J.*, 3 Dillon, 131.

Sarven *vs.* *Hall*, per Woodruff, *J.*, 5 Fisher, 415.

Sickles *vs.* Evans, per Clifford, *J.*, 2 Fisher, 417.

Goodyear *vs.* Providence Rubber Co., per Clifford, *J.*, 2 Fisher, 199.

Burr *vs.* Duryee, 1 Wall. 575.

Carhart *vs.* Austin, per Clifford, *J.*, 2 Fisher, 543.

Gill *vs.* Wells, 22 Wall. 1.

Wicks *vs.* Stevens, 2 Wood. 312.

Ball *vs.* Wellington, 6 O. G., 933.

Tarr *vs.* Webb, 10 Blat., 99.

Russell *vs* Dodge, 3 Otto, 460.

Collar Co. *vs* Van Dusen, 23 Wallace, 530.

Wood Paper Co. *vs* Fiber Co., 23 Wallace, 568.

2. The clause of the Act of 1870, sec. 73, relied upon by appellant, applies only to machine patents.

Tarr *vs.* Webb; 10 Blatch. 96.

3. The appellant's bill and exhibits show that there was a drawing annexed to the original patent, No. 50,617, and therefore the introduction of new matter into the reissues thereof is expressly excluded by the

language of the clause of Act of 1870, relied upon, which is as follows:

"But when there is *neither* model *nor* drawing, amendments may be made upon proof satisfactory to Commissioner etc." Act of 1870, Section 73.

The allegations of the bill of complaint are

"That with said application for a patent, (Noble's original application), said Noble duly filed his specifications and *drawings*, describing his said invention, etc." (Bill of complaint p. 33).

"A copy of said letters patent (Noble's original patent), are now on file in this action and are hereby referred to and made a part hereof," (Bill of complaint p 333).

This original patent, No. 50,617, and *annexed drawing* will be found as complainant's exhibit at page 29 to 32 of record.

4. The Court below only referredto the intermediate reissues argumentatively.

Knight *vs.* Baltimore & Ohio R. R., per Taney, *C. J.*, 3 Fisher, 1.

III.

Upon the view of the law held by the court below, the order and decree, in pursuance thereof, made by that court were correct.

1. The decision of the court below, granting complainant leave to amend, (at folio 223), impliedly reserved to complainant the right to prosecute their suit,

so far as related to the patent not passed upon by the decision, viz: patent 5799. That decision was as follows:

"The defendants must have judgment on the demurrer, with leave to the complainant to amend the bill by striking out all such parts as relate to the reissued patents, No. 4818 and 4819." (folio 223.)

The following order was entered: (folio 74.)

"ORDER SUSTAINING DEMURRER TO AMEND BILL.

"This cause heretofore argued and submitted on the demurrer of the defendants to the complainant's amended bill of complaint herein, having been duly considered, the court now here reads its opinions, and orders that said demurrer herein be sustained, with leave to complainant to amend said bill." (folio 74.)

2. The complainant came into court and *declined to amend* their bill, and thereupon the court took the only course that it could, viz: entered an order for a decree, dismissing it.

See record, folio 77.

Entry of Complainant's default.

"On the fifth day of October, A. D. 1875, the *default* of complainant *to amend its said amended bill* of complaint was duly entered."

"On the sixth day of October, A. D. 1875, complainant's counsel being present in open court, and

declining to amend its said bill of complaint, an order was made and entered herein in the words and figures following, to wit: * * * * * *

"ORDER TO ENTER DECREE.

"And now at this day, on motion of C. K. Greathouse, Esq., Solicitor for defendants; M. A. Wheaton, Esq., Solicitor for complainant, *being present* and *declining* to amend the amended bill of complaint herein, the *default of complainant* to amend said bill *having been duly entered*, it is ordered that a decree be entered herein, dismissing said bill of complaint." folio 78.

On the 18th day of October, *final decree* was entered, as follows:

FINAL DECREE. (folio 80.)

"The Court, on the 22d day of September, A. D. 1875, being a day in July Term, A. D. 1875 of said Court, sustained the demurrer of the defendants in the complainant's amended bill of complaint herein, with leave to complainant to amend its said bill, on or before the next succeeding rule day, and the said time granted complainant within which to amend its said bill having expired, and the default of said complainant to amend its said bill have been duly entered, and the Court having on the 6th day of October, of said term and year, on motion of C. R. Greathouse, Esq., Solicitor for the defendants: Mr. A. Wheaton, Esq., Solicitor for complainants, being present in open court, and declining to amend its said bill of complaint, he having elected to abide by his said bill of complaint, as filed in the cause, ordered, that decree be entered therein, dismissing said bill.

Thereupon, upon consideration thereof, it is ordered, adjudged and decreed, that the complainants' said bill be, and the same hereby is dismissed, and that the said complainant pay the said defendants their costs in this behalf expended."

3. Demurrer set down for argument. Plaintiff obtained an order to amend, but did not amend within the time limited in the order.

V. C. Kindersley held that the common sense of the case was that the order for leave to amend had the effect of getting rid of the bill as it then stood, and unless the plaintiff amended within the time limited the bill was gone. There were no precedents.

Hotlick v. Reynolds, 9 W. R. 431, V. C. K.

Armstead v. Durham, 11 Beav. 428, M. R.

Story's Equity Pleading, Sec. 459 and note and Sec. 459 a.

4. It is stated in the opinion of the court below, that "upon the validity of the latter re-issue, (No. 5790,) no question is made;" hence the opinion did not affect re-issue 5,799.

5. The appellant could, by having amended its bill in accordance with the opinion of the court below, have proceeded with the suit as to re-issue 5799; having refused so to do, that objection cannot now be taken. House vs Mullen 22 Wallace 42

6. A demurrer, being frequently on matter of form, is not, in general, a bar to a new bill; but if the court, on demurrer, has clearly decided upon the merits of the question between the parties, the decision may be pleaded in another suit.

Daniells' Chan. Prac., Vol. 1, 598.

Act of 1870, Sec. § 53.
Revised Statute, Sec. 4916.

SEC. 4916. Whenever any patent is inoperative or invalid, by reason of a defective or insufficient specification, or by reason of the patentee claiming as his own invention or discovery more than he had a right to claim as new, if the error has arisen by inadvertence, accident, or mistake, and without any fraudulent or deceptive intention, the Commissioner shall, on the surrender of such patent and the payment of the duty required by law, cause a new patent for the **same invention,** and in accordance with the corrected specification, to be issued to the patentee, or, in the case of his death or of an assignment of the whole or any undivided part of the original patent, then to his executors, administrators, or assigns, for the unexpired part of the term of the original patent. Such surrender shall take effect upon the issue of the amended patent.

The Commissioner may, in his discretion, cause several patents to be issued for distinct and separate parts of the **thing patented,** upon demand of the applicant, and upon payment of the required fee for a reissue of each of such reissued letters patent. The specifications and claim in every such case shall be subject to revision and restriction in the same manner as original applications are. Every patent so reissued, together with the corrected specification, shall have the same effect and operation in law, on the trial of all actions for causes thereafter arising, as if the same had been originally filed in such corrected form; but no new matter shall be introduced into the specification, nor in case of a machine patent shall the model or drawings be amended, except each by the other; but when there is neither model nor drawing, amendments may be made upon proof satisfactory to the Commissioner that such new matter or amendment was a part of the **original invention,** and was omitted from the specification by inadvertence, accident or mistake, as aforesaid.

"It is where a patent is inoperative or invalid by reason of a defective or insufficient description, specification, or claim, and not where the device is not described or specified at all, that permission is given to re-issue the patent. Devices not described or specified may, if they are the invention of the patentee, be the subject of a patent subject to all other rules governing the inventor's rights; but it is not the office of a re-issue to embrace them. Seymour *vs.* Osborne, 11 Wall. 516, 544. It is true, that an observation of the Court, in Hussey *vs.* Bradley, (2 Fisher's Pat. Case, 362, 371,) gives a broader scope to the right of re-issue, and an intimation in Doughty *vs.* West, (Id 553, 556,) is in the same direction, but, in the subsequent case of Doughty *vs.* West, (3d Id. 580, and 6 Blatchf. C. C. R. 429,) founded on a re-issue of the same patent the re-issue was sustained, on grounds entirely consistent with the doctrine above stated, and the rule is, in my judgment, not only clearly correct in principle, but settled by the authority of the Supreme Court, in the case first above named."

Sarven *vs.* Hall, 9th Blatchford, 526, 527.

"Reissued patents, in order that they may be valid, must be for the same invention as the surrendered originals. Inoperative or invalid patents, which are so by reason of a defective or insufficient specification, or by reason that the patentee claimed as his own invention or discovery more than he had a right to claim as new, may be surrendered if the error arose by inadvertence, accident or mistake, and without

any fraudulent or deceptive intention, and the provision is that the Commissioner, in that event, shall, upon the payment of the sum required by law, cause a new patent for the same invention, and in accordance with the corrected specification, to be issued to he proper party, as prescribed in the fifty-third section of the Patent Act.

"16 Stat. at Large, 206."

Gill *vs.* Wells, 22 Wallace's Reports, 15.

"The decision of the Commissioner in granting the reissue is, it is true, so far conclusive as to preclude in the present suit for infringement any inquiry into its correctness outside of the patents themselves. His action in any case within the limits of his authority, is not open to collateral impeachment. But that authority being limited to a reissue for the same invention as that embraced in the original patent, a reissue for anything more is necessarily inoperative and void. To determine the identity of the invention the two patents may be compared. Thus compared, the reissue here appears on its face to be for a different invention, and the Commissioner, therefore, exceeded his authority in issuing it. Seymour *vs.* Osborne, 11 Wall. 544; Wicks *vs.* Stevens, 2 Woods, 312."

Russell *vs.* Dodge, 3d Otto, 464.

"Where the Commissioner accepts a surrender of an original patent and grants a new patent, his decision in the premises, in a suit for infringement, is

final and conclusive, and is not re-examinable in such a suit in the Circuit Court, unless it is apparent upon the face of the patent that he has exceeded his authority; that there is such a repugnancy between the old and the new patent that it must be held, as matter of legal construction, that the new patent is not for the same invention as that embraced and secured in the original patent."

Seymour *vs.* Osborne, 11th Wallace, 543.

"Power is undoubtedly conferred upon the Commissioner to allow the specification to be amended if the patent is inoperative or invalid for the reason stated in the provision, and to reissue the patent in proper form. Pursuant to that authority, he may doubtless allow the patentee to re-describe his invention, and to include in the description and claims of the patent, not only what was well described before, but whatever was suggested or indicated in the specification or drawings which properly belongs to the invention. Whether he can be permitted to go further and resort to the original application, and the model filed in the Patent Office, it is not now necessary to decide, as it conceded that the improvements in question were neither suggested or indicated in the application or model, nor in the specification or drawings. The additions made to the specifications were interpolations and not amendments, and consequently the Commissioner had no authority to allow them to be made. Comparing the patents, it is clear, on the face of the instruments, that the reissued patent is not for the

same invention as that secured by the original patent, and, therefore, it is void. Having come to this conclusion, it is unnecessary to decide the other questions presented for decision. Cemplainants are not entitled to relief."

Carhart *v.* Austin, 2 Fisher's Pat. Cases, 553.

"Such reissue, however, must, by the express words of the section authorizing the same, be for the same invention, and, consequently, where it appears, on a comparison of the two instruments, as matter of law, that the reissued patent is not for the same invention as that embraced and secured in the original patent, the reissued patent is invalid, because that state of the case shows that the Commissioner has exceeded his jurisdiction; Batten *vs.* Taggard, 17 How., 83; O'Reilly *vs.* Morse, 15 How., 111, 112; Potter *vs.* Holland, Law's Dig., 618, (vol. 1, p. 382); Allen *vs.* Blunt, 3 Story, C. C. 744; French *vs.* Rogers, Law's Dig., 619, (vol. 1, p. 133). Applying that rule to the present case, I am of the opinion that the reissued letters patent, under consideration, must be deemed invalid for the reason that the patent is not for the same invention as that embodied and secured in the original patent, which fully appears, as matter of law, from a comparison of the two instruments. In view of the conclusion announced as to the construction of the respective patents of the complainant, very little need be said upon the subject of infringement."

Sickles *vs.* Evans, 2 Fisher's Pat. Cases, 138.

"It must then be admitted that the process described in this reissue was unknown before 1853, and if then invented by Watt & Burgess, it was *patentable to them. Whether it was in fact patented to them is another question,* * * * * * * * * * * * * And the claim of the patent was for the treatment of wood shavings by chemical agencies, 'in the order substantially as described.'

How then, is it possible to maintain that a process to obtain pulp by chemical action in a single operation had been invented by the patentees when their first patent was granted? *And what is of more importance, how is it possible to hold that such an invention was patented to them?* We find no satisfactory evidence that the idea of a single stage process was ever conceived by Watt & Burgess, until after a patent disclosing it was granted to Marie Amendee Charles Mellier, on the 26th day of May, 1857. This was before the surrender of their original patent, and before the reissue, and if Watt & Burgess had not invented the single stage process, when their original was granted the reissue 1449 is for a different *invention from that described or referred to in the original patent;* and such is the testimony of the experts who have been examined in this case. *But the testimony of the experts are not needed.* It appears on the face of the *reissue that it is for a different invention, for the reissue is attempted to be sustained only on the ground that it is for a single stage process.* Both the reissues, therefore, we *think are void.*"

Watt *v.* Burgess reissue, 1449. 23d Wallace, 597, 598, 599.

"It appearing that the defendant infringes the patent of 1872, the next question to be solved is, whether that patent is valid.

1. Was it a legal re-issue of the patent of 1866? The patent of 1866 was confined to portable revolving cotton presses. I assume that the reissued patent extends to all cotton presses, stationary as well as portable, for, if confined to the latter, the defendant does not infringe it. Had this extension to stationary presses been omitted in the original patent by accident or mistake, it might be corrected in the reissued patent. But its application to revolving presses generally was first obtained and then abandoned in the application for the original patent of 1866, and the claim as finally made by the patentee, and to secure which alone his patent issued, was for a combination applicable to portable presses only. It cannot be said, therefore, that a neglect to claim the combination as applicable to revolving presses generally was an inadvertence, accident or mistake. It was an exclusion designed and understood at the time.

Attempts to grasp claims by means of reissued patents, which, whilst the evidence is fresh at the time of the original application, the patentee would not have the hardihood to make, are getting too frequent, and are too often acquiesced in by the patent office.

Perhaps this is not to be wondered at, when we consider the persistency with which claims once abandoned are pressed upon the department after the evidence of their futility has been forgotten."

Wicks *vs.* Stevens, 2 Woods' Reports, 312.

Re-issue No. 3377, April 13, 1869. Claim, Record, page 40.

Subjecting nitro-glycerine to the influence of confinement, combined with such degree of pressure, or heat and pressure, however produced, as to result in the decomposition and explosion of the nitro-glycerine, substantially as hereinbefore described.

Re-issue No. 3378, April 13, 1869. Claim, Record, pages 45, 46.

1. The decomposition or explosion of nitro-glycerine, when under confinement, as hereinbefore described, by means of heat generated within the mass of nitro-glycerine through the agency of an electric spark, or of a voltaic, magnetic-electric, or static-electric current, however generated, substantially as and for the purpose hereinbefore set forth.

2. The decomposition or explosion of nitro-glycerine, when under restraint or confinement, as hereinbefore described, by the evolution or generation of heated gas or gases, and the consequent production of heat and pressure within or upon the fluid mass of nitro-glycerine, by means of the explosion of gunpowder or other equivalent explosive or fulminating substance, under or upon the surface of the nitro-glycerine, substantially as and for the purposes hereinbefore set forth.

3. The use and application of the plug of wood, metal, or other suitable material, for holding or con-

taining gunpowder, or other explosive substance, within, upon, or near to the fluid mass of confined nitro-glycerine, together with the parts and arrangements of such plug, in the manner and substantially

16 a

Claim of Re-issue 3379, *April* 13, 1869.
Record, p. 51.

Having thus *fully described the discoveries and inventions of the said Alfred Nobel*, with sufficient clearness and distinctness to enable others skilled in the sciences and arts to which they belong, to make and use the same,

What we claim as the discoveries or inventions of the said NOBEL, and desire to secure by Letters Patent in the name of the United States Blasting-Oil Company, aforesaid, as the assignee of the said NOBEL, is as follows:

Making nitro-glycerine (being a mixture of glycerine with nitric and sulphuric acids) by pouring together, into a funnel or other suitable receptacle, separate streams of glycerine and of those acids, and discharging the mixture therefrom into a body of cold water, maintained at low temperature by any suitable means.

Nobel discovered that the difficulty experienced in effecting the explosion of nitro-glycerine, and the analogous substances before mentioned, could be overcome by mixing or combining them with gunpowder, gun cotton, or other similar substance. This mixing may be effected in any convenient manner,

Re-issue No. 3377, April 13, 1869. Claim, Record, page 40.

Subjecting nitro-glycerine to the influence of confinement, combined with such degree of pressure, or heat and pressure, however produced, as to result in the decomposition and explosion of the nitro-glycerine, substantially as hereinbefore described.

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2. The decomposition or explosion of nitro-glycerine, when under restraint or confinement, as hereinbefore described, by the evolution or generation of heated gas or gases, and the consequent production of heat and pressure within or upon the fluid mass of nitro-glycerine, by means of the explosion of gunpowder or other equivalent explosive or fulminating substance, under or upon the surface of the nitro-glycerine, substantially as and for the purposes hereinbefore set forth.

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Making nitro-glycerine (being a mixture of glycerine with nitric and sulphuric acids) by pouring together, into a funnel or other suitable receptacle, separate streams of glycerine and of those acids, and discharging the mixture therefrom into a body of cold water, maintained at low temperature by any suitable means.

16.

Claim of Re-issue 3380, *April* 13, 1869.
Record, p. 56.

Having *thus fully described the discoveries and inventions of the said Alfred Nobel,* with sufficient clearness and distinctness to enable others skilled in the sciences and arts to which they belong, to make and use the same.

What we claim as the discoveries or inventions of the said NOBEL, and desire to secure by Letters Patent in the name of the United States Blasting-Oil Company, aforesaid, as the assignee of the said NOBEL, is as follows:

The application and use of nitro-glycerine, simple or compounded, as an explosive for blasting, or for disrupting purposes, in the manner, and substantially as hereinbefore described.

taining gunpowder, or other explosive substance, within, upon, or near to the fluid mass of confined nitro-glycerine, together with the parts and arrangements of such plug, in the manner and substantially as hereinbefore described.

4. The application and use of a percussion cap, fitted to a train or other fuse used for conducting fire, when used in connection with nitro-glycerine, so that the said cap, evolving on its explosion the required heated gases, or the forces of percussion or concussion, shall decompose or explode nitro-glycerine, when under confinement, in the manner and substantially as hereinbefore described.

5. The application and use, within the fluid mass of nitro-glycerine, subjected to confinement, as hereinbefore described, of lime and water, or other substances which will, on combining under similar circumstances, generate a sufficient degree of heat, for the purpose of decomposing or exploding nitro-glycerine by means of heat generated within it, substantially as hereinbefore described.

Re-issue 1,818, March 19, 1872. Statement and Claim, Record, p. 59.

Nobel discovered that the difficulty experienced in effecting the explosion of nitro-glycerine, and the analogous substances before mentioned, could be overcome by mixing or combining them with gunpowder, gun cotton, or other similar substance. This mixing may be effected in any convenient manner,

and the proportions in which they are to be combined may be varied to suit the pleasure or convenience of the user or manufacturer. The nitro-glycerine may be mixed with gunpowder or gun-cotton, either of which will absorb a considerable quantity of nitro-glycerine—say thirty per cent., more or less—in such proportions as to make the compound either wet or comparatively dry. If mixed with gunpowder, it may be either absorbed with it by pouring the nytro-glycerine on the mass of gunpowder, or the two may be mingled together by trituration, the powder in the nytro-glycerine.

The effect of these combinations will produce an explosive especially suitable for certain blasting purposes—for example, in crevice rock—and greatly superior either to gunpowder or gun-cotton in explosive force, and quite readily exploded, so that it may be fired and exploded by means of a match or electric spark in like manner as gunpowder, or gun-cotton alone. By means of this combination with gunpowder, or gun-cotton, or other similar readily explosive substances of nitro-glycerine, and the analogous substances before named, which are liquid at the ordinary temperature, these substances which had not at the date of Nobel's invention been applied to any technical use as explosives, owing to their difficulty of explosion, have been introduced from the domain of science into that of practical use in the arts, and have rendered of commercial value what was previously known as a mere chemical curiosity.

1 The utilization, as explosives, of nitro-glycerine and the analogous liquid substances hereinbefore

mentioned, by combining therewith gunpowder, gun cotton, or other similar substances developing a rapid heat on combustion, substantially as hereinbefore described.

2 The combination of gunpowder with nitro-glycerine substantially as and for the purposes hereinbefore described.

3 The combination of gun-cotton with nitro-glycerine substantially as and for the purposes hereinbefore described.

Re-issue 4819, March 19, 1872. Statement and Claim, Record, page 61.

Nobel discovered that, by mixing nitro-glycerine with rocket-powder, which is a mere loose mechanical mixture of nitre, charcoal, and sulphur, the difficulty in effecting the explosion of nitro-glycerine was effectually overcome. Rocket-powder is almost non-explosive, but readily burns and deflagrates on contact with a spark of fire, while nitro-glycerine, on the other hand, as before stated, is hard to explode; but when the explosion is obtained is extremely violent in its effects.

By the mixing of these substances a compound is produced which is a very powerful explosive, and is easily exploded by means of the simple contact with fire. The mixing may be effected in any convenient manner, and the proportions in which they are com-

bined may be varied to suit the pleasure or convenience of the user or manufacturer.

CLAIM.

The mixture of nitro-glycerine and rocket-powder, substantially as and for the purposes hereinbefore described.

Geo Harding

GEORGE HARDING.

Counsel for Appellee.

STATEMENT AND CLAIMS OF PATENT

50,617.

October 24th, 1865. R. p. 29.

To all whom it may concern:

Be it known that I, Alfred Nobel, of the city of Hamburg, having invented *the use of nitro-glycerine or analogous* substances, as a *substitute for gunpowder*, and I do hereby declare the following to be a full, clear and exact description of the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

My invention consists in the use as a *substitute for gunpowder* of *nitro-glycerine or its equivalent*, substantially in the manner described hereafter, *so that the said liquid, which, when exposed, cannot be wholly* decomposed and exploded, *shall, by confinement, be subjected to heat and pressure*, by which its total and immediate decomposition and explosion is effected.

CLAIM.

1. By exploding a quantity of gunpowder or other substances in contact with the liquid, (the powder being confined in a water-proof tube or case), the heated gases evolved from the powder being distributed throughout the mass of the liquid, raise the tempera-

ture of the latter sufficiently to decompose the same. When powder is used for this purpose, the case containing it may be immersed in the liquid, the powder being ignited by means of a fuse, or by an electric spark. If desirable, however, the liquid may be placed in a tube and inserted in a mass of powder, which is then ignited in any suitable manner.

2. By an electric spark, or by passing a powerful current of electricity through a fine wire immersed in liquid. An apparatus for thus affecting the explosion of the liquid is shown in the accompanying drawing. A, being the case containing the fluid ; B B, two wires which pass through glass tubes *a a*, or through other insulating substances into the interior of the case ; and *c*, a fine platina wire, which connects the ends of the wires B B together within the case

The platina wire is heated by an electric current, the material is in contact with the wire being thus decomposed, and the remaining portion subjected to the heat and pressure necessary to instantaneously decompose the whole mass, as already described.

3. By a fuse. This will do in a closed space, and under sufficient pressure, but if the gases of the decomposed liquid are enabled to escape before they accumulate to such pressure as to effect the requisite impulses of explosion, the liquid is decomposed by slowly and the fire expires before the whole mass is consumed.

I claim as my invention, and desire to secure by Letters-Patent, the use of nitro-glycerine or its equivalent, substantially in the manner and for the purpose described.

TITLES OF THE SEVERAL

ORIGINAL AND REISSUED NOBEL PATENTS.

(Original.) 50,617. (October 24, 1865.)

"A new and useful improved substitute for Gunpowder."

Reissue 3377. (April 13, 1869.)

"New and useful improved mode of exploding Nitro-glycerine." (Rec. folio 103.)

Reissue 3378. (April 13, 1869.)

"New and useful improved device for exploding Nitro-glycerine." (Rec. folio 41.)

3379. (April 13, 1869.)

"New and useful improved mode of manufacturing Nitro-glycerine." (Rec. folio 140.)

3380. (April 13, 1869.)

"New and useful improvement in the use of Nitro-glycerine." (Rec. folio 157.)

Reissue 4818. (March 19, 1872.)

"New and useful compounds containing Nitro-glycerine." (Rec. folio 174.)

Reissue 4819. (March 19, 1872.)

"New and useful improvement in Nitro-glycerine compounds." (Rec. folio 184.)